Mercedes-Benz

Mercedes-Benz MY2023 E450 All Terrain 4MATIC PEMS Report

1. Background

Mercedes-Benz Group AG (Mercedes-Benz), with headquarters in Stuttgart, Germany, is a large automotive company that sells vehicles and services in nearly every country in the world. Mercedes-Benz has production facilities in Europe, North and South America, Asia, and Africa. The current brand portfolio includes Mercedes-Benz as well as Mercedes-AMG, Mercedes-Maybach, smart, and EQ.

As part of fulfilling obligations under the Consent Decree entered on March 9, 2021 ("Consent Decree") with the United States and California, Mercedes-Benz conducts off-cycle testing, encompassing Portable Emissions Measurement System (PEMS) testing, to demonstrate off-cycle tailpipe emissions and to screen for undisclosed auxiliary emission control devices (AECDs) and defeat devices in U.S. light- and medium-duty vehicles. The testing was conducted as described in Section VII of the Consent Decree. Pursuant to the Consent Decree, Mercedes-Benz will conduct PEMS testing for any new diesel vehicles issued Certificates of Conformity or Executive Orders through and including MY2023 as light- or medium-duty diesel models, and for three vehicles certified as light- or medium-duty gasoline Test Groups per Model Year from MY2021 through and including MY2024. This PEMS report relates to MY2023 E450 All Terrain 4MATIC from Test Group PMBXV03.0HY4, which is the third highest volume Test Group applicable for MY2023 based on the projected 50 states' sales volumes prepared for NMOG + NOx fleet averages under Tier 3.

2. Approach

To demonstrate off-cycle tailpipe emissions, tests were performed on public roads in the Los Angeles area on city, highway, and mountain routes. These test routes have been approved by CARB. Emissions measured and/or calculated and reported include oxides of nitrogen (NO_x), carbon monoxide (CO), carbon dioxide (CO_2), total hydrocarbons (THC), and non-methane organic gases (NMOG). All tests were executed by a team in Long Beach, CA. This team is independent of Mercedes-Benz's product development departments. All vehicles were configured and tested by MBRDNA Long Beach Compliance staff. Test results were then analyzed to ensure quality control processes took place before and after each test sequence, including instrument calibration and calibration with reference gasses.

3. Emissions Results

MY2023 vehicle with the specifications listed in Table 1 was tested in April 2022. Tables 2 through 4 provide the vehicle test results of the combined route segments performed in the default drive mode (Comfort Mode).

Table 1: Vehicle Specification

Model	Tier	Drive type	HP	Torque (ft.lb)	Transmission	Exh Treatment	Fuel	Start Mileage
E450 All Terrain	ULEV50	AWD	362	369	9 Automatic	TWC	Gasoline	813

Table 2: Highway Results

	A1 Highway East (g/mi)					B2 Highway West (g/mi)				
Model	**CO_2**	**CO**	**THC**	**NO_X**	**NMOG**	**CO_2**	**CO**	**THC**	**NO_X**	**NMOG**
E450 All Terrain	248.20	0.21649	0.00043	0.00431	0.00040	199.86	0.15549	0.00000	0.00346	0.00000

Table 3: Mountain Results

	A2 Mountain Uphill (g/mi)					B1 Mountain Downhill (g/mi)				
Model	**CO_2**	**CO**	**THC**	**NO_X**	**NMOG**	**CO_2**	**CO**	**THC**	**NO_X**	**NMOG**
E450 All Terrain	430.49	0.60080	0.00246	0.00736	0.00234	156.90	0.14069	0.00017	0.00823	0.00016

Table 4: Cold Start and Urban Driving Result

	A0 Long Beach → CARB (g/mi)					LA City (g/mi)				
Model	**CO_2**	**CO**	**THC**	**NO_X**	**NMOG**	**CO_2**	**CO**	**THC**	**NO_X**	**NMOG**
E450 All Terrain	242.12	0.22944	0.01280	0.00444	0.013024	302.22	0.26726	0.00000	0.00795	0.00000

4. Trip Statistics

Tables 5 to 10 summarize the vehicle test statistics and environmental conditions during each test cycle.

Table 5: Highway East (A1)

Trip Duration h.mm.ss	Distance (mi)	V*Apos‡	Average Speed (mi/h)	Standstill %	Constant %	Acceleration %	Deceleration %	Cumulative pos. altitude (m)	Average temperature (F)
0.35.22	27.96	15.032	47.44	3.91	0.24	50.66	45.19	424.2	73.64

Table 6: Highway West (B2)

Trip Duration h.mm.ss	Distance (mi)	V*Apos‡	Average Speed (mi/h)	Standstill %	Constant %	Acceleration %	Deceleration %	Cumulative pos. altitude (m)	Average temperature (F)
0.33.01	28.63	14.133	52.03	3.53	0.25	49.27	46.95	204.7	77.18

Table 7: Mountain Uphill (A2)

Trip Duration h.mm.ss	Distance (mi)	V*Apos‡	Average Speed (mi/h)	Standstill %	Constant %	Acceleration %	Deceleration %	Cumulative pos. altitude (m)	Average temperature (F)
0.35.40	17.25	14.526	29.02	16.21	0.14	43.60	40.05	1008.2	72.52

Table 8: Mountain Downhill (B1)

Trip Duration h.mm.ss	Distance (mi)	V*Apos‡	Average Speed (mi/h)	Standstill %	Constant %	Acceleration %	Deceleration %	Cumulative pos. altitude (m)	Average temperature (F)
0.34.33	18.19	15.634	31.59	19.83	0.29	47.03	32.85	86.5	72.95

Table 9: Long Beach to CARB (A0)

Trip Duration h.mm.ss	Distance (mi)	V*Apos‡	Average Speed (mi/h)	Standstill %	Constant %	Acceleration %	Deceleration %	Cumulative pos. altitude (m)	Average temperature (F)
0.33.33	24.31	17.410	43.48	8.89	0.30	44.61	46.20	236.4	71.76

Table 10: LA City

Trip Duration h.mm.ss	Distance (mi)	V*Apos‡	Average Speed (mi/h)	Standstill %	Constant %	Acceleration %	Deceleration %	Cumulative pos. altitude (m)	Average temperature (F)
0.51.30	16.06	11.806	18.71	25.56	0.10	37.54	36.80	229.3	68.39

‡V*Apos results are the 95th percentile values displayed in m^2/s^3

5. Routes

The routes for on-road emissions testing are approved by CARB and intended to include various road and traffic conditions. These routes include mountain driving at high elevation, urban driving, and highway driving. These routes are separated into six test sections with no key-off cycles between A0 and B2. For the Combined Test Route, the test vehicle was cold-started at the Mercedes-Benz Los Angeles Technology Center (MB LATC) and data was collected for Segment A0 between MB LATC and the official start of the route at CARB El Monte. The Urban/Downtown L.A. test route, consistent with past Off-Cycle tests was driven on a different day, and was started with a running engine after a transfer drive from MB LATC to the start of the route with no key-off cycles.

Table 11: Description of Test Routes and Calculated Trip Statistics

Route	Distance (mi)	Segment Duration	Max – Min Elevation (m)	Average Speed (mph)	Fraction Hwy	Fraction Urban/Rural
A0	24	34 min	131	44	67	33
A1	28	35 min	288	47	75	25
A2	17	35 min	969	29	0	100
B1	18	34 min	983	32	25	75
B2	29	33 min	288	52	76	24
LA City	16	54 min	76	19	19	81

5.1 Highway Sections (A1 & B2)

These routes are representative of highway driving in California. Each route segment is approximately 28 miles and is composed of 95% highway and 5% surface roads. These segments travel between Vineyard Ave, Ontario CA and California Air Resource Board office at 9528 Telstar Ave, El Monte CA via Hwy 10. The average speed is 50mph and the net elevation change is approximately 945ft (288m).

A1 – Highway East

Figure 1. Map of Route A1 – Highway East. Including speed and elevation

B2 – Highway West

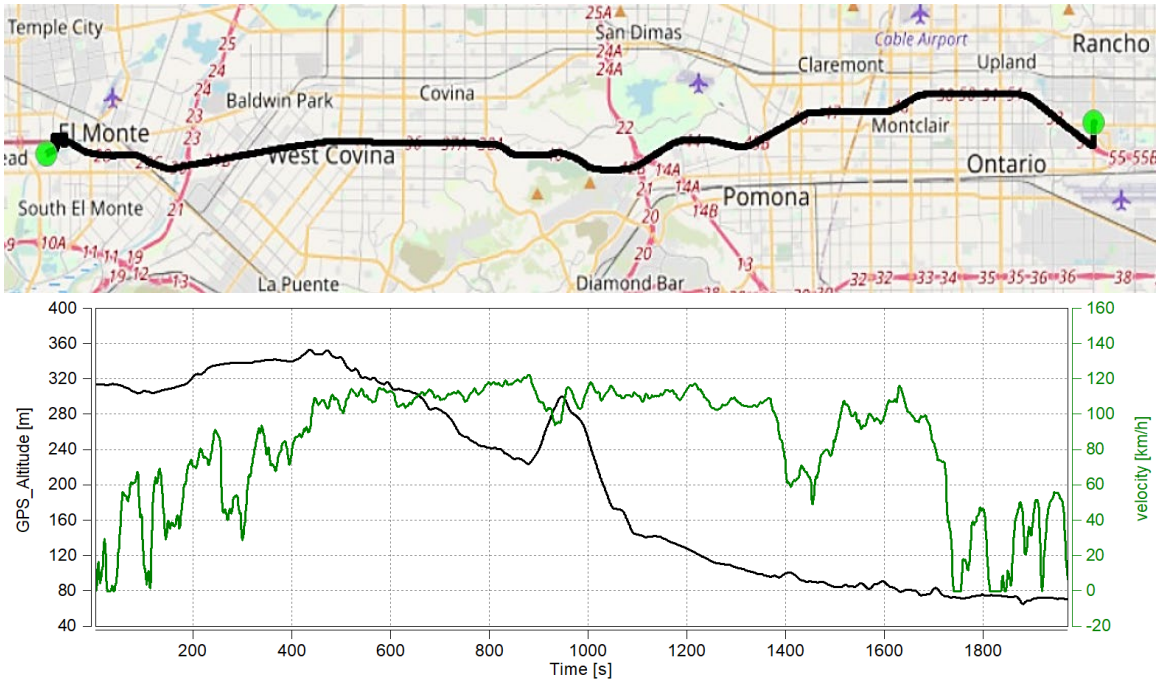


Figure 2. Map of Route B2 – Highway West. Including speed and elevation

5.2 Mountain Sections (A2 & B1)

This route is representative of rural uphill and downhill driving. Each route segment is approximately 17.5 miles and is composed of 90% surface roads and 10% highway, starting from Vineyard Ave in Ontario and traveling to Mt. Baldy, then returning to Vineyard Ave. The average speed is 30mph. The net elevation change is 3242ft (988m).

A2 – Mountain Uphill

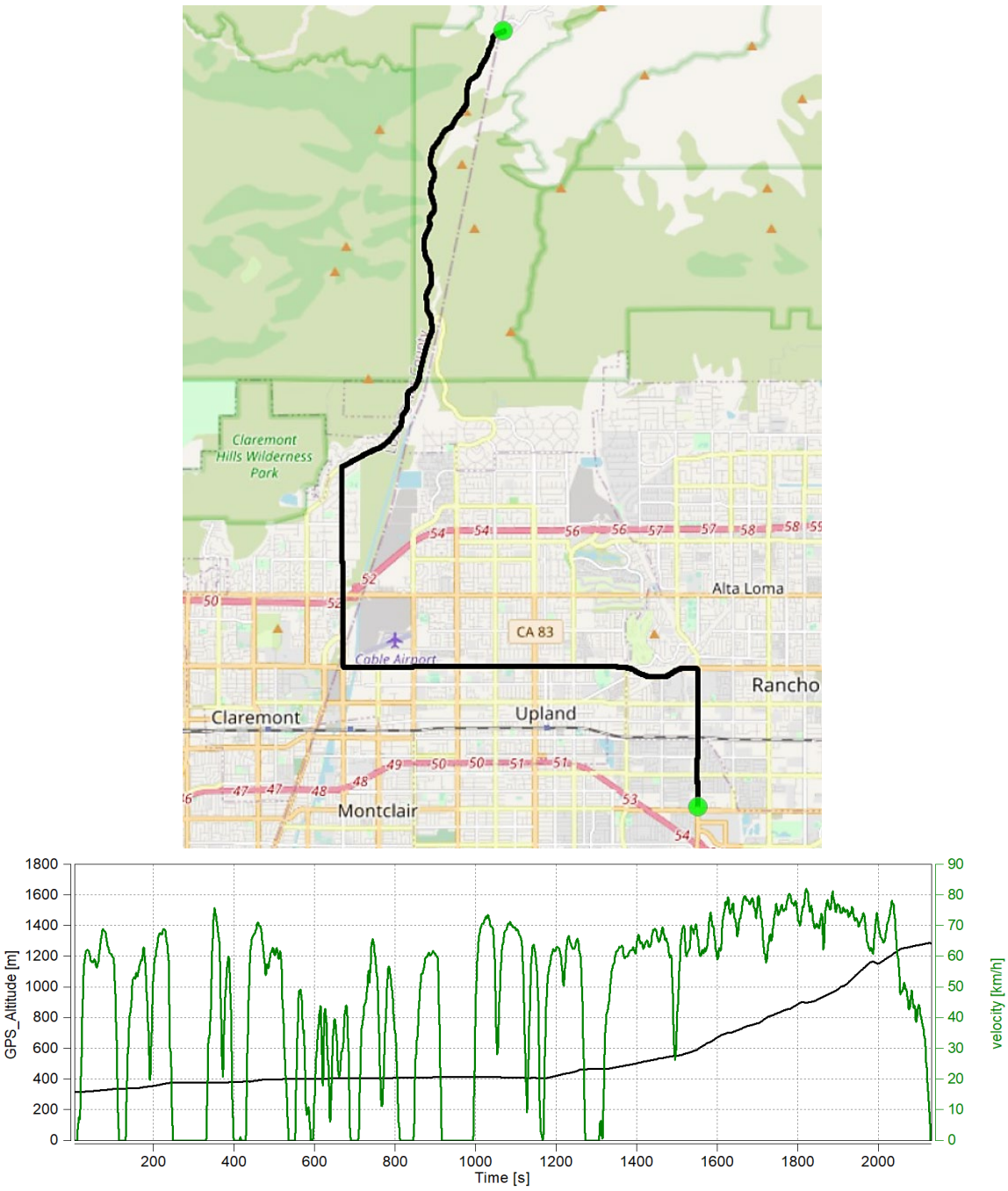


Figure 3. Map of Route A2 – Mountain Uphill. Including speed and elevation

B1 – Mountain Downhill.

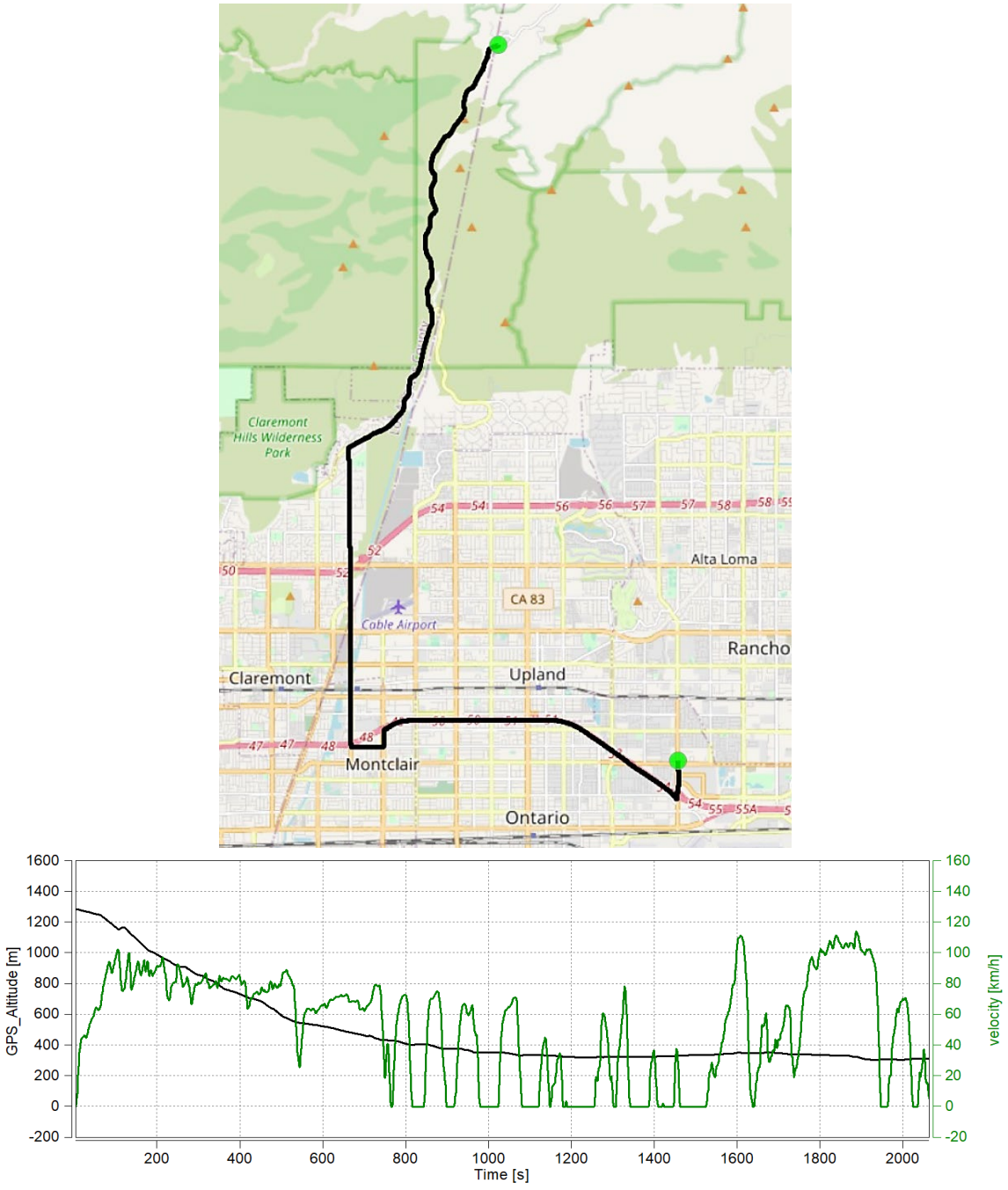


Figure 4. Map of Route B1 – Mountain Downhill. Including speed and elevation

5.3 Long Beach to CARB Section (A0)

This route travels between 4035 Via Oro Ave, Long Beach CA and 9528 Telstar Ave, El Monte CA. This route contains a cold start event with the test vehicle normalized to ambient conditions, beginning from Long Beach.

A0 – Long Beach to CARB

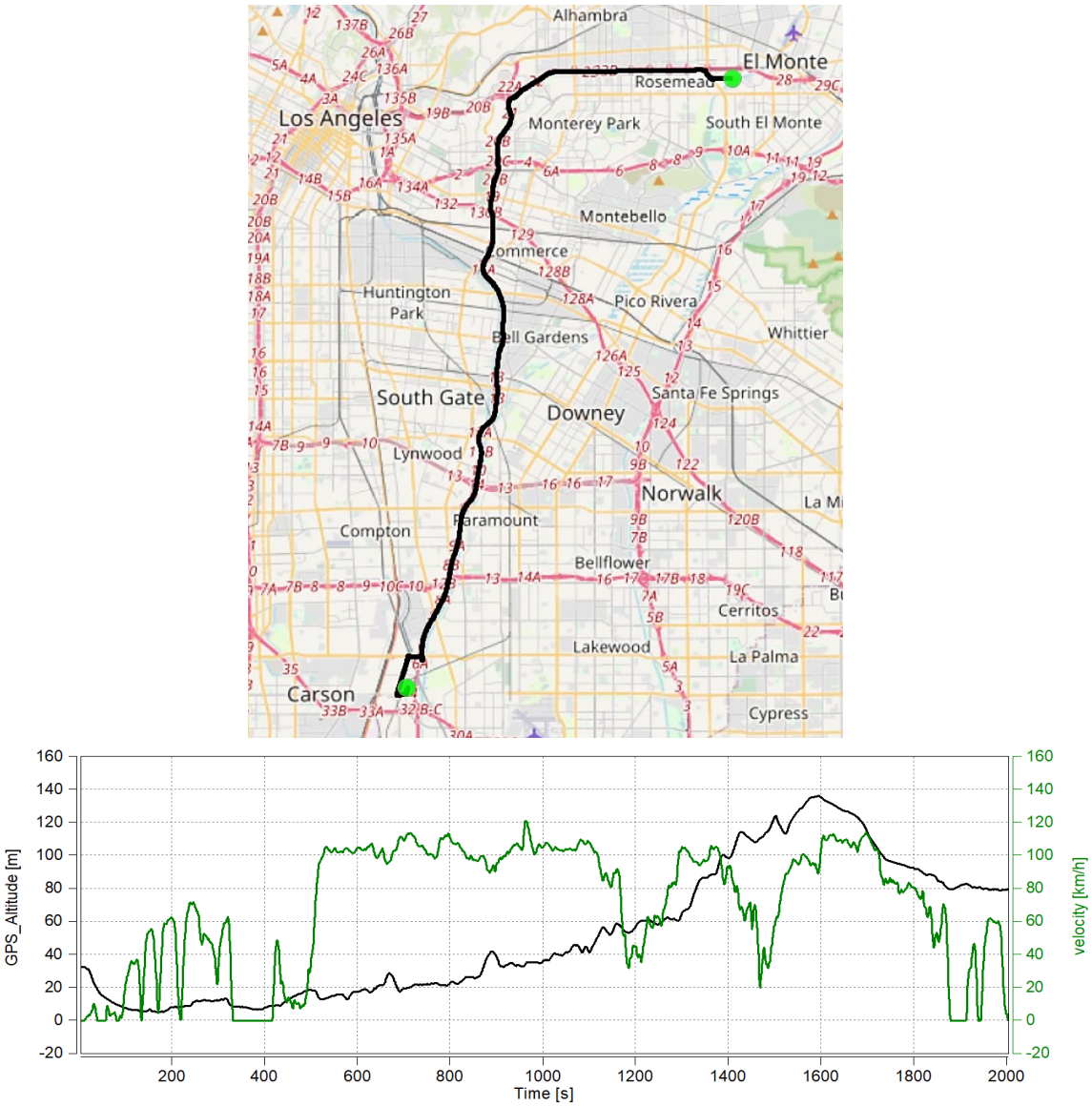


Figure 5. Map of Route A0 – Long Beach to CARB, El Monte. Including speed and elevation

5.4 LA City Driving Section

This route is intended to represent city driving and is a modernized reflection of the LA4. There are minor modifications to account for traffic patterns and roads which have changed since 1972 but this route represents a similar pattern to the original route. The route is approximately 16 miles and is 20% highway, 80% surface road with an average speed of 16mph.

LA City Route

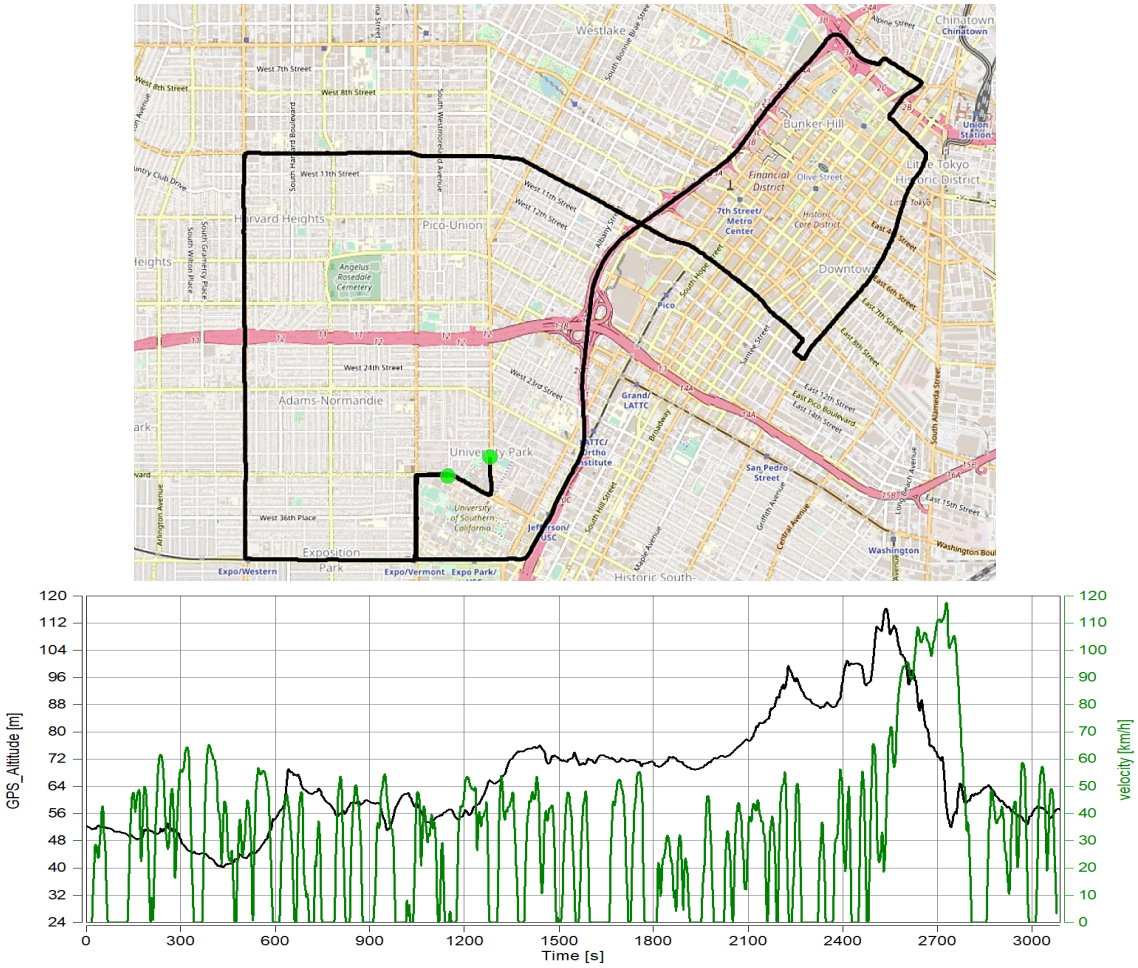


Figure 6. Map of LA City Route. Including speed and elevation

6. Log Sheets

A comprehensive list with information regarding each PEMS test conducted is provided separately as an addendum to this report. In addition to the information concerning PEMS test results, all test records will also be provided in the same file.

The information is provided in the file: Flat File Log Sheet MY2023 E450 All Terrain.pdf

This file contains log sheet information on PEMS testing conducted with the MY2023 Mercedes-Benz E450 All Terrain 4MATIC test vehicle 213-20667. The table also includes information and explanations on valid, aborted, and invalid tests.

7. Appendix

The following pages include emission report summaries for each valid test performed using the PEMS system and AVL post processing.

Case: 213-20667
Page: Trip Summary

'213-20667 A1 Freeway East'
Start Date: 04/14/2022
Start Time: 10:01:13.0

AVL
Concerto M.O.V.E, 2019

Trip Duration	2122.00	s
Trip Duration (a)	2122.00	s
Trip Distance	27.96	mi
Trip Distance (a)	27.96	mi
Trip Fuel Cons. (b)	2.83	kg
Trip Fuel Cons. (ab)	2.83	kg
Trip Fuel Cons. EU (ac)	2.29	kg
Trip Fuel Cons. US (ac)	2.28	kg
Trip Fuel Economy (b)	27.94	mpg_US
Trip Fuel Economy (ab)	27.94	mpg_US
Trip Fuel Economy EU (ac)	34.62	mpg_US
Trip Fuel Economy US (ac)	34.65	mpg_US
Trip Fuel Economy GGE (b)	27.94	mpg_US
Trip Fuel Economy GGE (ab)	27.94	mpg_US
Trip Fuel Economy EU GGE (ac)	34.62	mpg_US
Trip Fuel Economy US GGE (ac)	34.65	mpg_US
Trip Av. Eng. Speed	1328.11	rpm
Trip Av. Torque	90.70	lbft
Trip Av. Power	25.57	hp
Trip Work		
Trip Work (a)	15.07	hphr
Trip Exhaust Mass	35.03	kg
Trip Exhaust Mass EU (ac)	43.57	kg
Trip Exhaust Mass US (ac)	43.62	kg
Trip Av. Amb. Temperature	73.64	deg_F
Trip Av. Humidity	22.83	%
Trip Av. GPS Altitude	233.31	m
Fuel Type	Petrol (E10)	

ave THC	-0.77976	ppm
ave NMHC	-0.76417	ppm
ave CH4	-0.01560	ppm
ave CO	160.38410	ppm
ave CO2	12.17666	%
ave NOx	4.30979	ppm
ave PM	n/a	mg/m3
ave Soot meas	n/a	mg/m3
ave Soot	n/a	mg/m3
ave PN	n/a	#/cm3
tot THC	0.01183	g
tot NMHC	0.01094	g
tot CH4	0.00026	g
tot CO	6.01956	g
tot CO2	6940.66566	g
tot NO (d)	0.06110	g
tot NO2	0.06073	g
tot NOx	0.12054	g
tot Soot	n/a	g
tot Soot meas	n/a	g
tot PM	n/a	g
tot PN	n/a	#
PM measurement type	0.00000	-
tot Soot on PM filter (estim.)	0.00000	mg
Soot --> PM simple scaling factor	1.00000	-
Trip Av. Veh. Speed	47.44082	mi/hr
Trip Distance Share Urban	12.06966	% distanc
Trip Distance Share Rural	12.87732	% distanc
Trip Distance Share Motorway	75.05302	% distanc

BS CO2	460.53143	g/hphr
BS CO	0.39941	g/hphr
BS THC	0.00078	g/hphr
BS NMHC	0.00073	g/hphr
BS CH4	0.00002	g/hphr
BS NO (d)	0.00405	g/hphr
BS NO2	0.00403	g/hphr
BS NOx	0.00800	g/hphr
BS Soot	n/a	g/hphr
BS Soot meas	n/a	g/hphr
BS PM	n/a	g/hphr
BS PN	n/a	#/hpr
DS CO2	248.20242	g/mi
DS CO	0.21526	g/mi
DS THC	0.00042	g/mi
DS NMHC	0.00039	g/mi
DS CH4	0.00001	g/mi
DS NO (d)	0.00218	g/mi
DS NO2	0.00217	g/mi
DS NOx	0.00431	g/mi
DS Soot	n/a	g/mi
DS Soot meas	n/a	g/mi
DS PM	n/a	g/mi
DS PN	n/a	#/mi
FS CO2	2450.45221	g/kg
FS CO	2.12525	g/kg
FS THC	0.00418	g/kg
FS NMHC	0.00386	g/kg
FS CH4	0.00009	g/kg
FS NO (d)	0.02157	g/kg
FS NO2	0.02144	g/kg
FS NOx	0.04256	g/kg
FS Soot	n/a	g/kg
FS Soot meas	n/a	g/kg
FS PM	n/a	g/kg
FS PN	n/a	#/kg

(a) GAS PEMS measurement state only, (b) based on fuel rate input (ECU, Fuel Meter), (c) Based on A/F ratio (eq 28-32 - R49)
(d) NO calculated using molecular weight of NO2, GGE=Gasoline Gallon Equivalents

Concerto Version: 505 Build 171, Serial Number: 1604
M.O.V.E Post-Processing: DT_1R4.1_B340
Legislation:

Vehicle: 213-20667 /
Engine: /
NOx Ambient Condition Corr.: 7 - CFR40 §1065.670
Dry / Wet Corr.: 2 - CFR40 §86.1342-90

Case: 213-20667
Page: Trip Summary Drift Corrected

'213-20667 A1 Freeway East'
Start Date: 04/14/2022
Start Time: 10:01:13.0

AVL
Concerto M.O.V.E, 2019

Trip Duration	2122.00	s
Trip Duration (a)	2122.00	s
Trip Distance	27.96	mi
Trip Distance (a)	27.96	mi
Trip Fuel Cons. (b)	2.83	kg
Trip Fuel Cons. (ab)	2.83	kg
Trip Fuel Cons. EU (ac)	2.29	kg
Trip Fuel Cons. US (ac)	2.28	kg
Trip Fuel Economy (b)	27.94	mpg_US
Trip Fuel Economy (ab)	27.94	mpg_US
Trip Fuel Economy EU (ac)	34.62	mpg_US
Trip Fuel Economy US (ac)	34.65	mpg_US
Trip Fuel Economy GGE (b)	27.94	mpg_US
Trip Fuel Economy GGE (ab)	27.94	mpg_US
Trip Fuel Economy EU GGE (ac)	34.62	mpg_US
Trip Fuel Economy US GGE (ac)	34.65	mpg_US
Trip Av. Eng. Speed	1328.11	rpm
Trip Av. Torque	90.70	lbft
Trip Av. Power	25.57	hp
Trip Work		
Trip Work (a)	15.07	hphr
Trip Exhaust Mass	35.03	kg
Trip Exhaust Mass EU (ac)	43.57	kg
Trip Exhaust Mass US (ac)	43.62	kg
Trip Av. Amb. Temperature	73.64	deg_F
Trip Av. Humidity	22.83	%
Trip Av. GPS Altitude	233.31	m
Fuel Type	Petrol (E10)	

ave THC DC	-0.78423	ppm
ave NMHC DC	-0.76855	ppm
ave CH4 DC	-0.01568	ppm
ave CO DC	161.29902	ppm
ave CO2 DC	12.17666	%
ave NOx DC	4.30867	ppm
ave PM	n/a	mg/m3
ave Soot meas	n/a	mg/m3
ave Soot	n/a	mg/m3
ave PN DC		
tot THC DC	0.01190	g
tot NMHC DC	0.01101	g
tot CH4 DC	0.00026	g
tot CO DC	6.05390	g
tot CO2 DC	6940.66566	g
tot NO DC (d)	0.06108	g
tot NO2 DC	0.06074	g
tot NOx DC	0.12052	g
tot Soot	n/a	g
tot Soot meas	n/a	g
tot PM	n/a	g
tot PN DC		
PM measurement type	0.00000	-
tot Soot on PM filter (estim.)	0.00000	mg
Soot --> PM simple scaling factor	1.00000	-
Trip Av. Veh. Speed	47.44082	mi/hr
Trip Distance Share Urban	12.06966	% distanc
Trip Distance Share Rural	12.87732	% distanc
Trip Distance Share Motorway	75.05302	% distanc

BS CO2 DC	460.53143	g/hphr
BS CO DC	0.40169	g/hphr
BS THC DC	0.00079	g/hphr
BS NMHC DC	0.00073	g/hphr
BS CH4 DC	0.00002	g/hphr
BS NO DC (d)	0.00405	g/hphr
BS NO2 DC	0.00403	g/hphr
BS NOx DC	0.00800	g/hphr
BS Soot	n/a	g/hphr
BS Soot meas	n/a	g/hphr
BS PM	n/a	g/hphr
BS PN DC		
DS CO2 DC	248.20242	g/mi
DS CO DC	0.21649	g/mi
DS THC DC	0.00043	g/mi
DS NMHC DC	0.00039	g/mi
DS CH4 DC	0.00001	g/mi
DS NO DC (d)	0.00218	g/mi
DS NO2 DC	0.00217	g/mi
DS NOx DC	0.00431	g/mi
DS Soot	n/a	g/mi
DS Soot meas	n/a	g/mi
DS PM	n/a	g/mi
DS PN DC		
FS CO2 DC	2450.45221	g/kg
FS CO DC	2.13737	g/kg
FS THC DC	0.00420	g/kg
FS NMHC DC	0.00389	g/kg
FS CH4 DC	0.00009	g/kg
FS NO DC (d)	0.02156	g/kg
FS NO2 DC	0.02144	g/kg
FS NOx DC	0.04255	g/kg
FS Soot	n/a	g/kg
FS Soot meas	n/a	g/kg
FS PM	n/a	g/kg
FS PN DC		

(a) GAS PEMS measurement state only, (b) based on fuel rate input (ECU, Fuel Meter), (c) Based on A/F ratio (eq 28-32 - R49)
(d) NO calculated using molecular weight of NO2, GGE=Gasoline Gallon Equivalents

Concerto Version: 505 Build 171, Serial Number: 1604
M.O.V.E Post-Processing: DT_1R4.1_B340
Legislation:

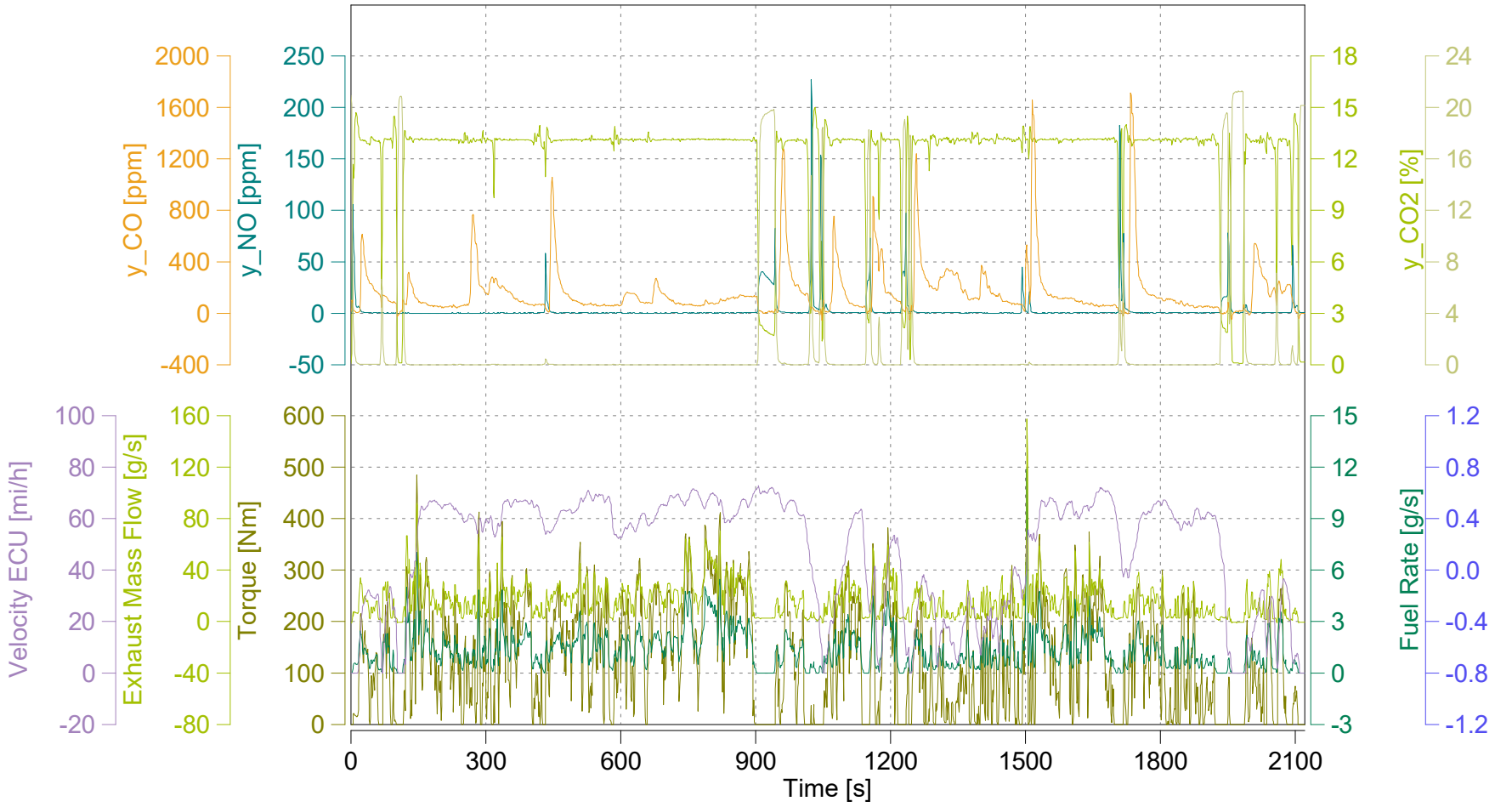
Vehicle: 213-20667 /
Engine: /
NOx Ambient Condition Corr.: 7 - CFR40 §1065.670
Dry / Wet Corr.: 2 - CFR40 §86.1342-90

Case: 213-20667
Page: Time Alignment Check

'213-20667 A1 Freeway East'
Start Date: 04/14/2022
Start Time: 10:01:13.0

AVL
Concerto

Absolute Time



y_THC
y_NO
y_CO2
y_O2
c_Soot
Fuel Rate
Exhaust Mass
Torque
Velocity ECU

AVL 492 Defa

THC
NO/NO2
CO/CO2
O2

Apply Defa

Alignment Pl

Reset Time

Reset Al

Apply Curr

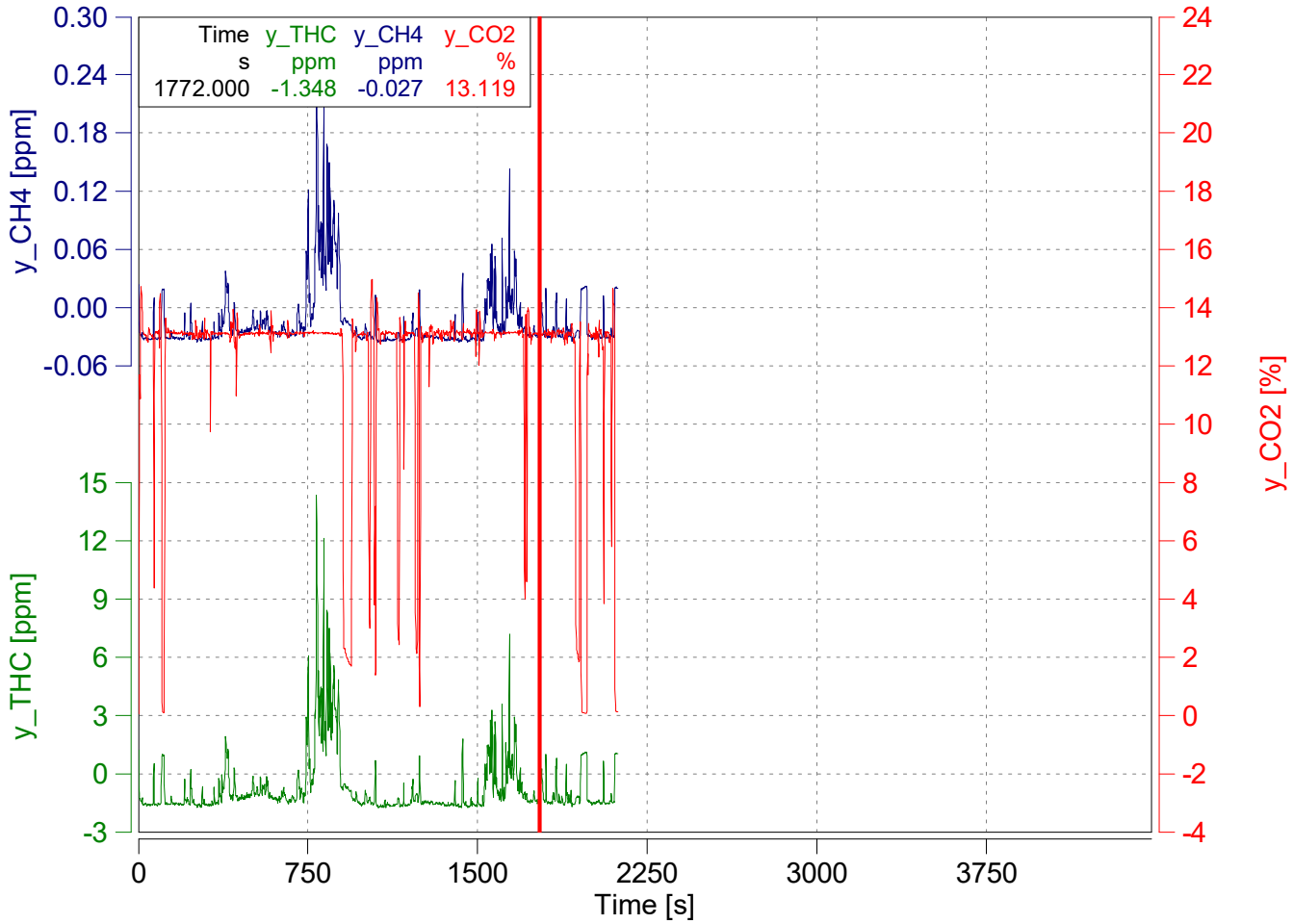
Concerto Version: 505 Build 171, Serial Number: 1604
M.O.V.E Post-Processing: DT_1R4.1_B340
Legislation:

Vehicle: 213-20667 /
Engine: /
NOx Ambient Condition Corr.: 7 - CFR40 §1065.670
Dry / Wet Corr.: 2 - CFR40 §86.1342-90

Case: 213-20667
Page: Time Alignment of Gas Concentrations

'213-20667 A1 Freeway East'
Start Date: 04/14/2022
Start Time: 10:01:13.0

AVL
Concerto M.O.V.E, 2019



Absolute Time Shifts

y_THC	s	-4.3
y_CH4	s	-6.3

Reset Time Shifts in Plot

Apply Current Values

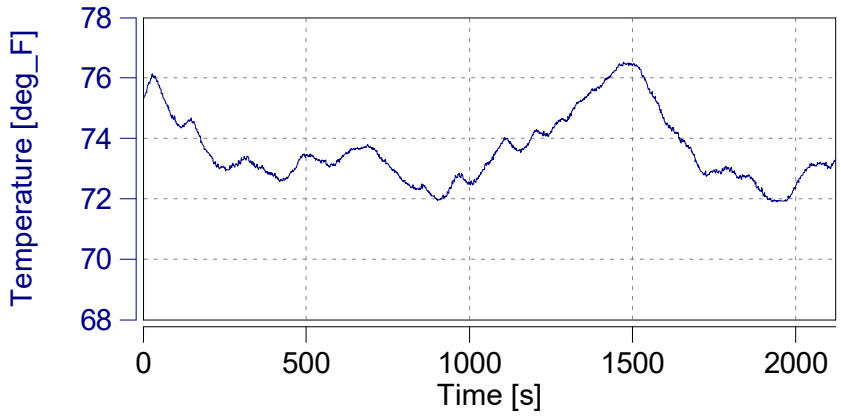
Concerto Version: 505 Build 171, Serial Number: 1604
M.O.V.E Post-Processing: DT_1R4.1_B340
Legislation:

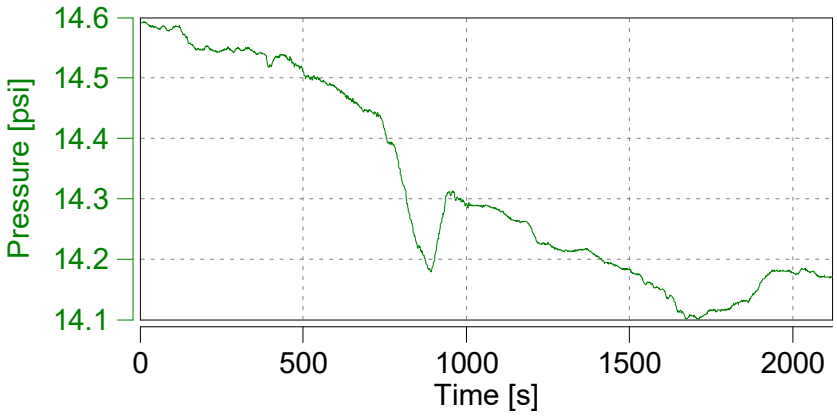
Vehicle: 213-20667 /
Engine: /
NOx Ambient Condition Corr.: 7 - CFR40 §1065.670
Dry / Wet Corr.: 2 - CFR40 §86.1342-90

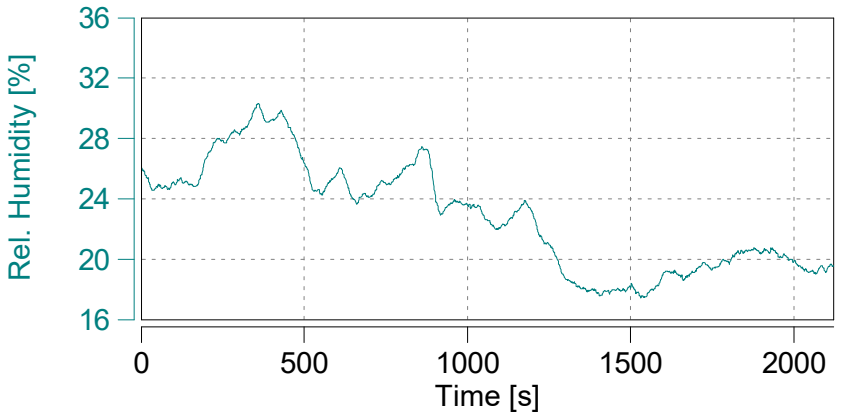
Case: 213-20667
Page: Ambient Conditions

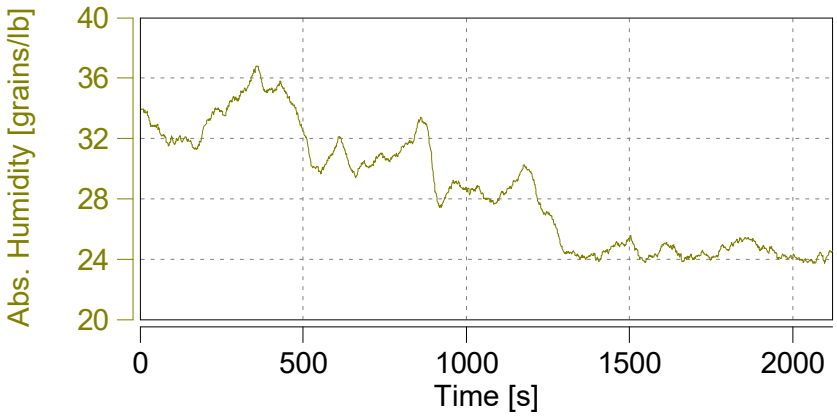
'213-20667 A1 Freeway East'
Start Date: 04/14/2022
Start Time: 10:01:13.0

AVL
Concerto M.O.V.E, 2019









Concerto Version: 505 Build 171, Serial Number: 1604
M.O.V.E Post-Processing: DT_1R4.1_B340
Legislation:

Vehicle: 213-20667 /
Engine: /
NOx Ambient Condition Corr.: 7 - CFR40 §1065.670
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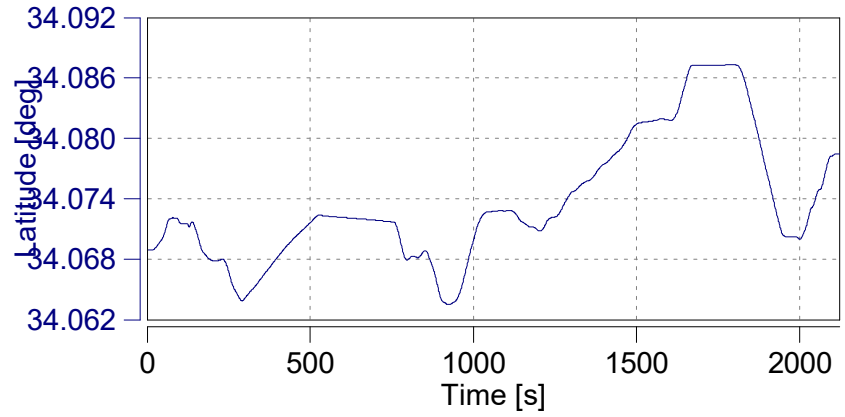
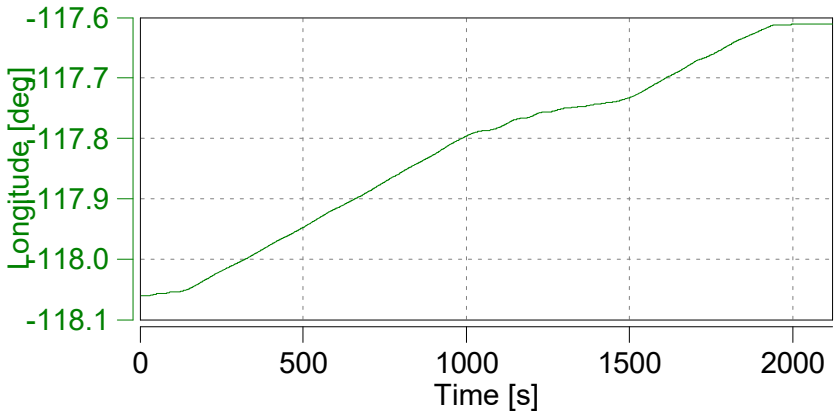
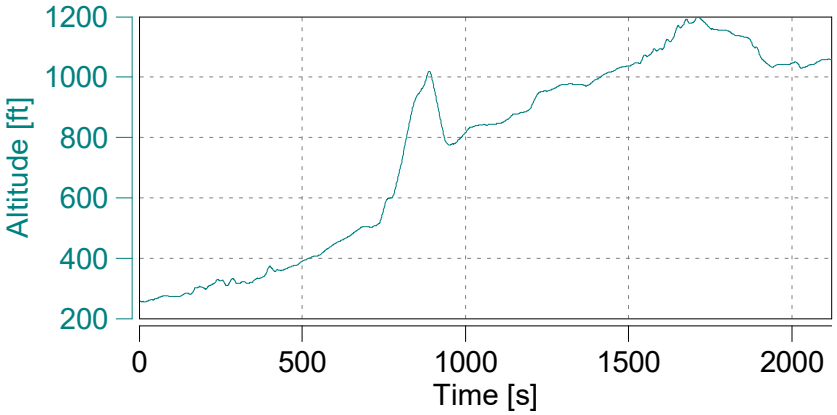
Case: 213-20667
Page: GPS

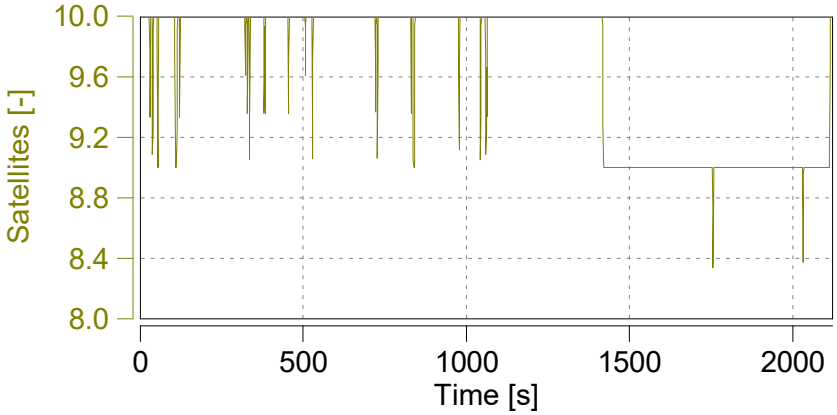
'213-20667 A1 Freeway East'
Start Date: 04/14/2022
Start Time: 10:01:13.0

AVL
Concerto M.O.V.E, 2019









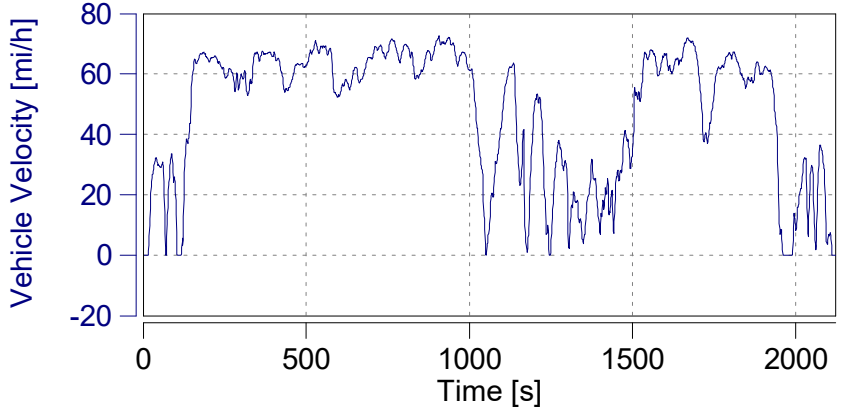
Concerto Version: 505 Build 171, Serial Number: 1604
M.O.V.E Post-Processing: DT_1R4.1_B340
Legislation:

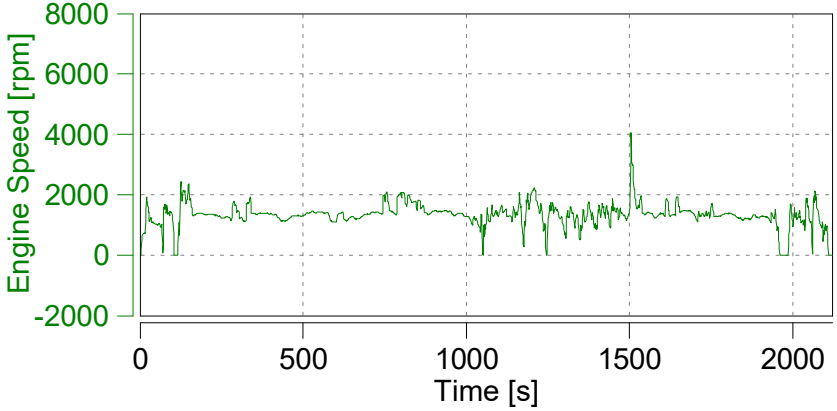
Vehicle: 213-20667 /
Engine: /
NOx Ambient Condition Corr.: 7 - CFR40 §1065.670
Dry / Wet Corr.: 2 - CFR40 §86.1342-90

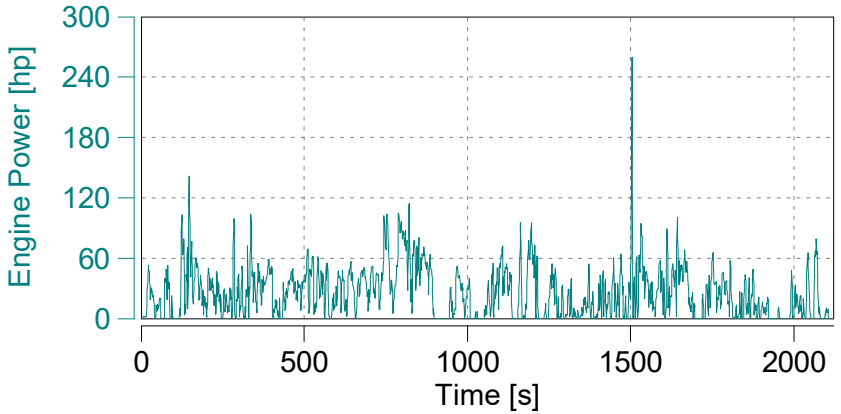
Case: 213-20667
Page: Engine (1)

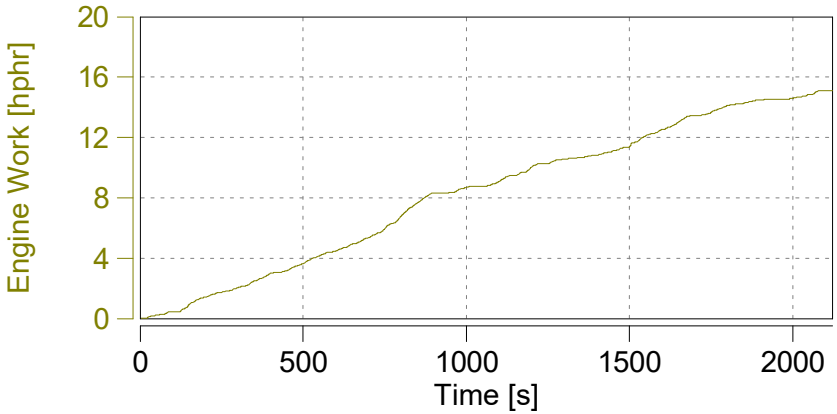
'213-20667 A1 Freeway East'
Start Date: 04/14/2022
Start Time: 10:01:13.0

AVL
Concerto M.O.V.E, 2019









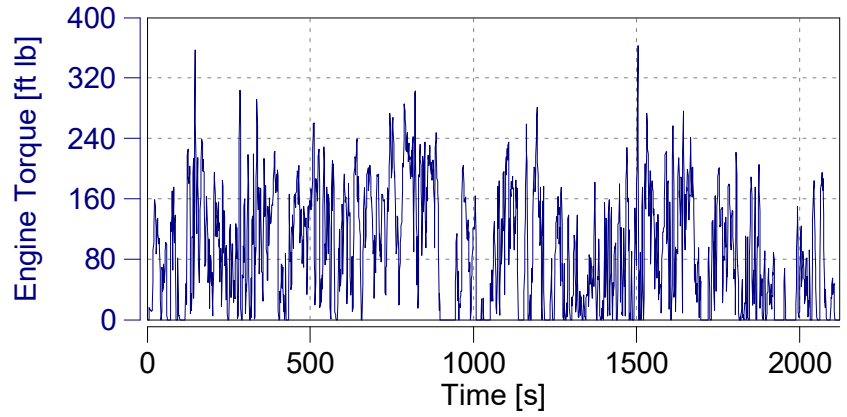
Concerto Version: 505 Build 171, Serial Number: 1604
M.O.V.E Post-Processing: DT_1R4.1_B340
Legislation:

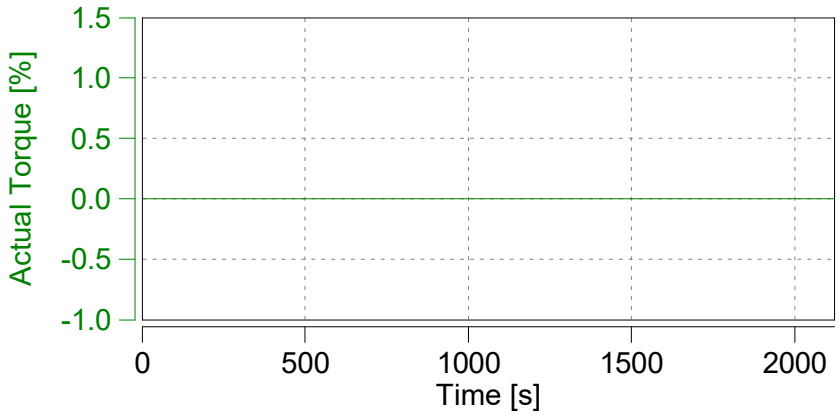
Vehicle: 213-20667 /
Engine: /
NOx Ambient Condition Corr.: 7 - CFR40 §1065.670
Dry / Wet Corr.: 2 - CFR40 §86.1342-90

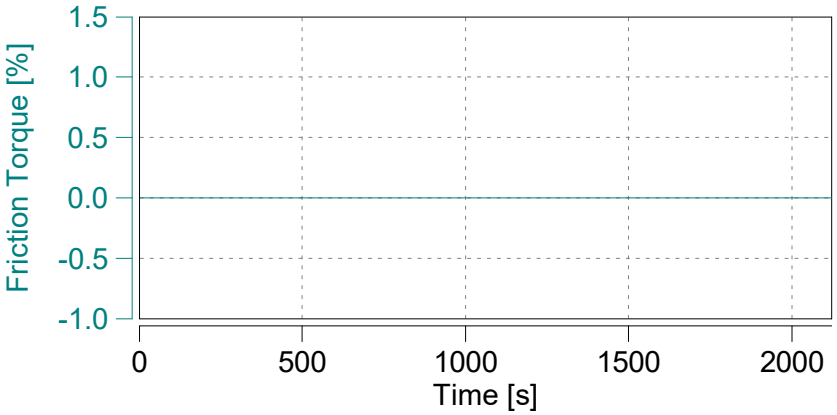
Case: 213-20667
Page: Engine (2)

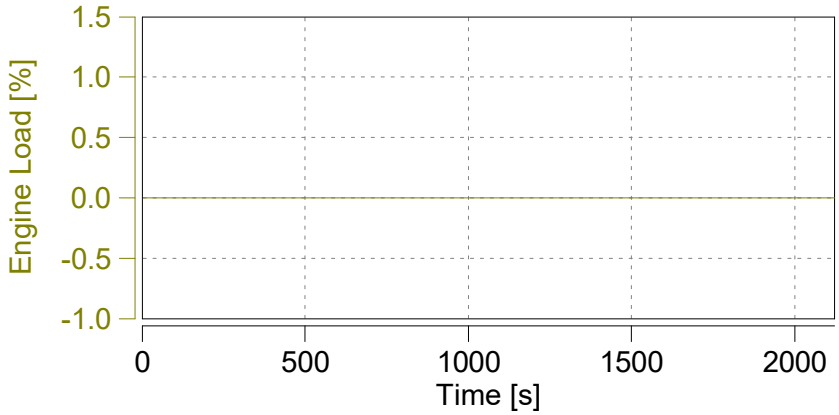
'213-20667 A1 Freeway East'
Start Date: 04/14/2022
Start Time: 10:01:13.0

AVL
Concerto M.O.V.E, 2019







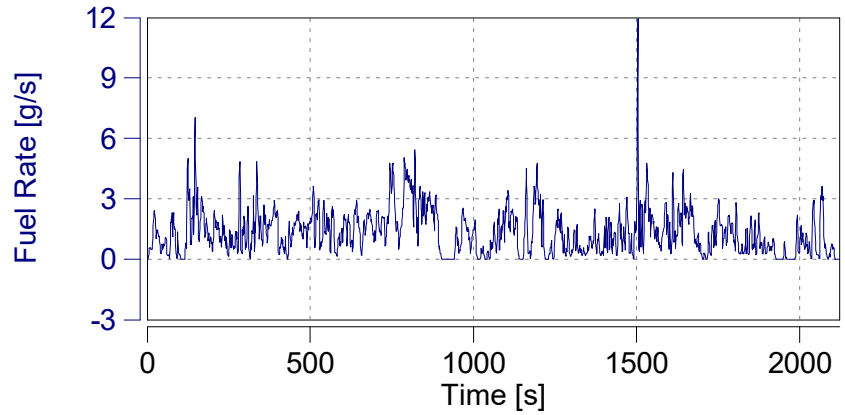


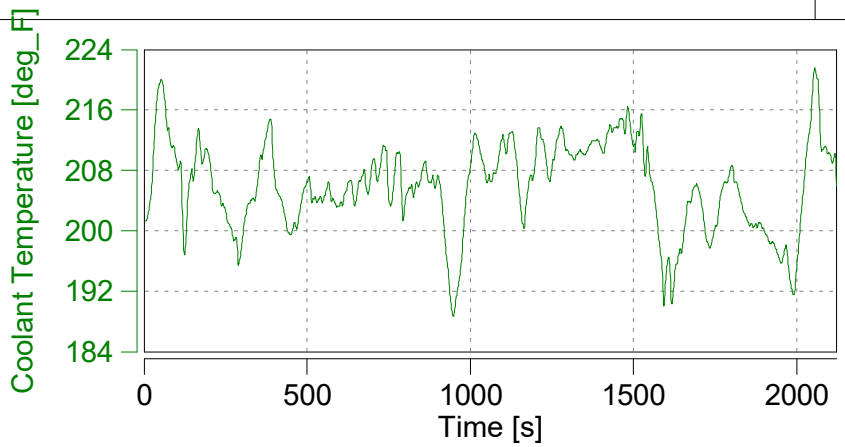
Concerto Version: 505 Build 171, Serial Number: 1604
M.O.V.E Post-Processing: DT_1R4.1_B340
Legislation:

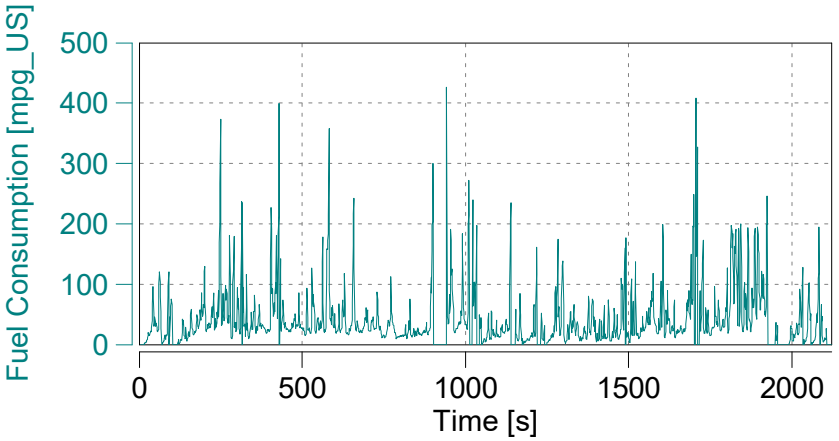
Vehicle: 213-20667 /
Engine: /
NOx Ambient Condition Corr.: 7 - CFR40 §1065.670
Dry / Wet Corr.: 2 - CFR40 §86.1342-90

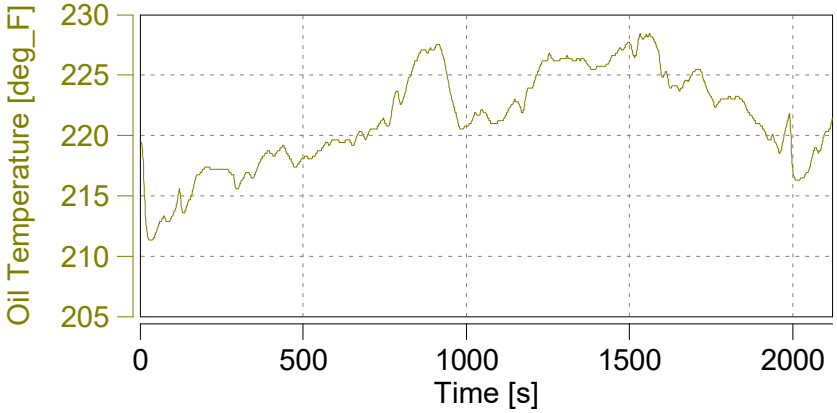
'213-20667 A1 Freeway East'
Start Date: 04/14/2022
Start Time: 10:01:13.0

AVL
Concerto M.O.V.E, 2019









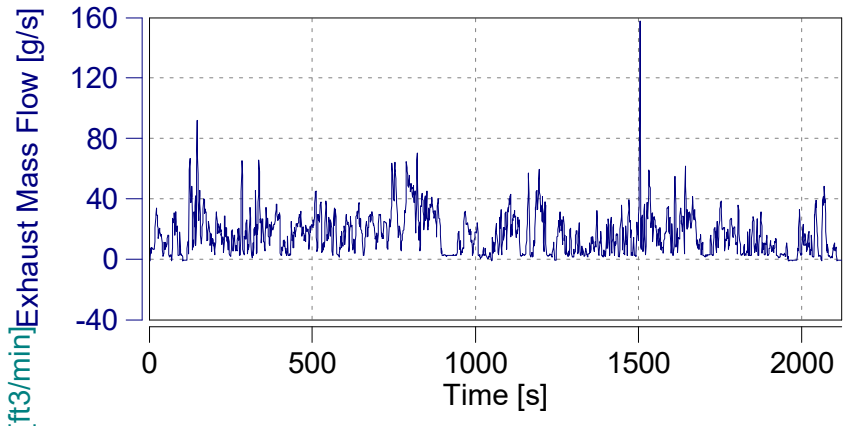
Concerto Version: 505 Build 171, Serial Number: 1604
M.O.V.E Post-Processing: DT_1R4.1_B340
Legislation:

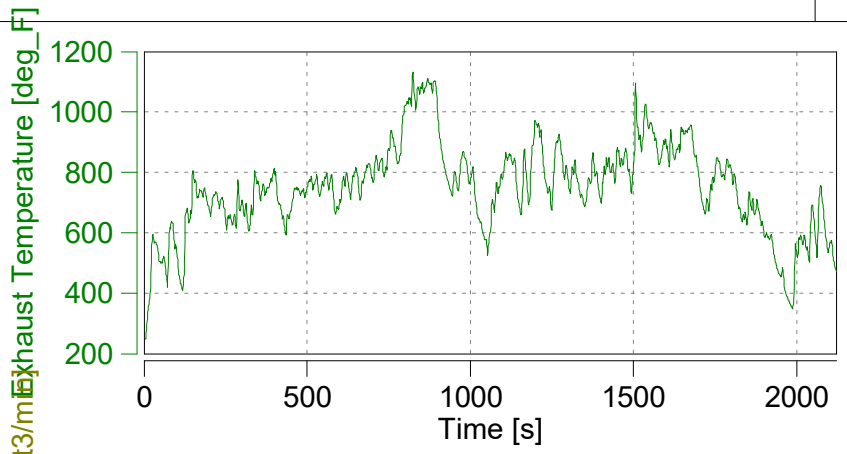
Vehicle: 213-20667 /
Engine: /
NOx Ambient Condition Corr.: 7 - CFR40 §1065.670
Dry / Wet Corr.: 2 - CFR40 §86.1342-90

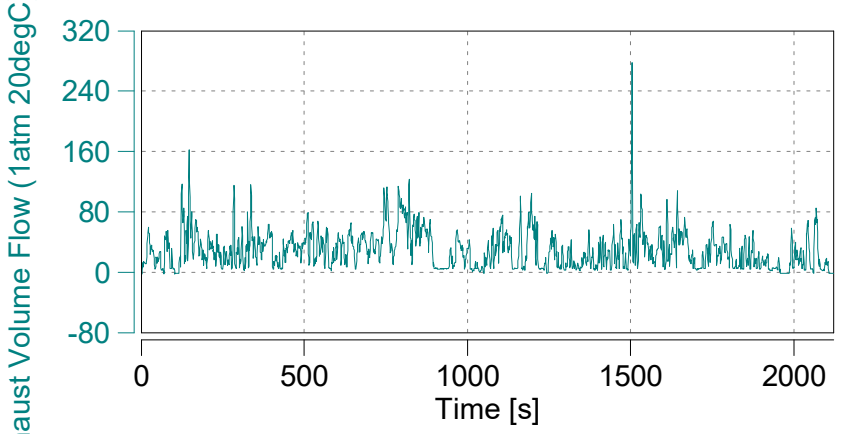
Case: 213-20667
Page: Exhaust Flow (1)

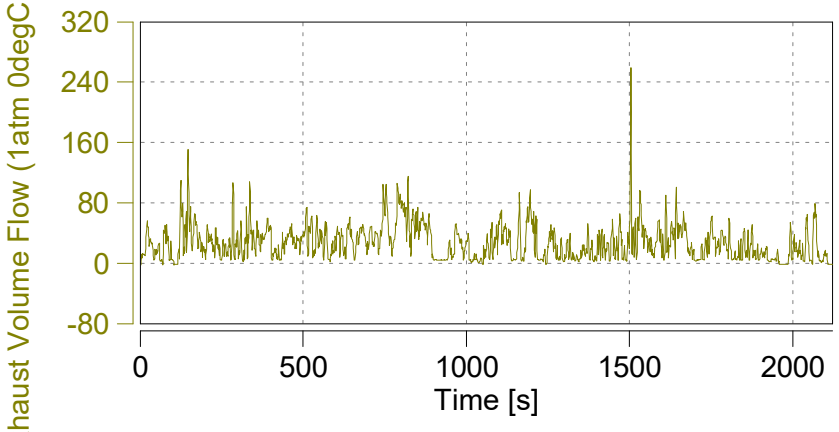
'213-20667 A1 Freeway East'
Start Date: 04/14/2022
Start Time: 10:01:13.0

AVL
Concerto M.O.V.E, 2019









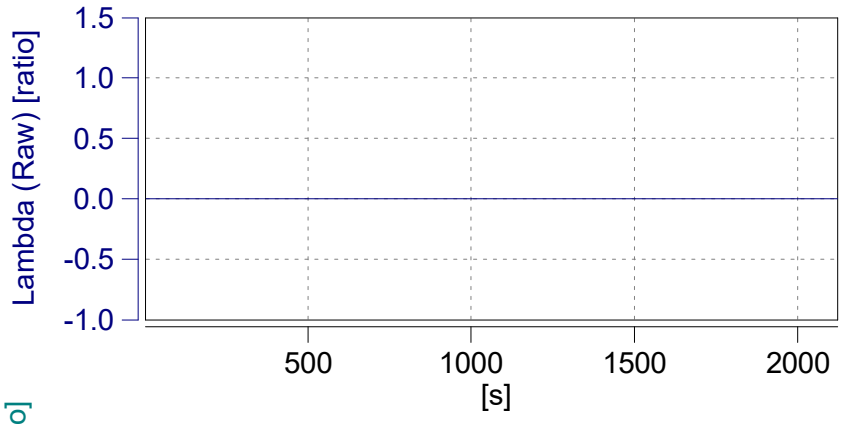
Concerto Version: 505 Build 171, Serial Number: 1604
M.O.V.E Post-Processing: DT_1R4.1_B340
Legislation:

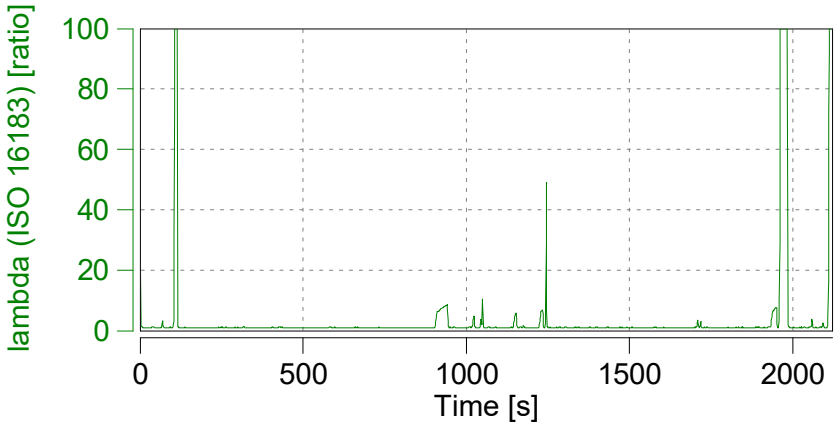
Vehicle: 213-20667 /
Engine: /
NOx Ambient Condition Corr.: 7 - CFR40 §1065.670
Dry / Wet Corr.: 2 - CFR40 §86.1342-90

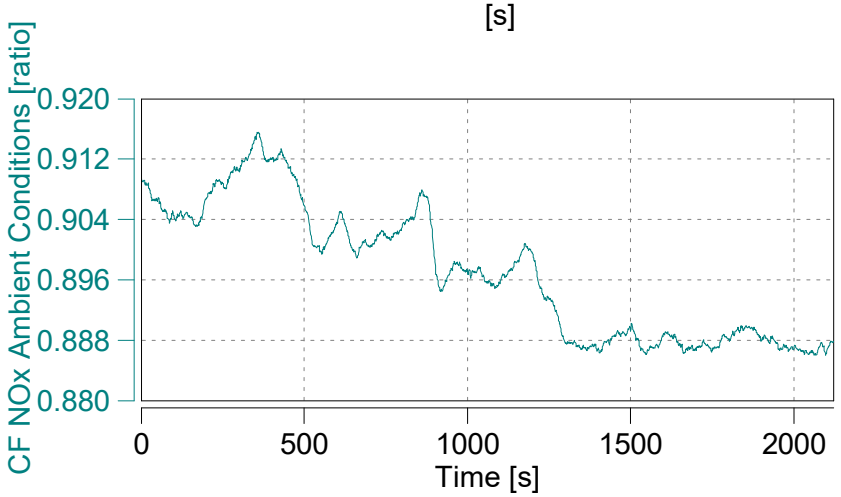
Case: 213-20667
Page: Exhaust Flow (2)

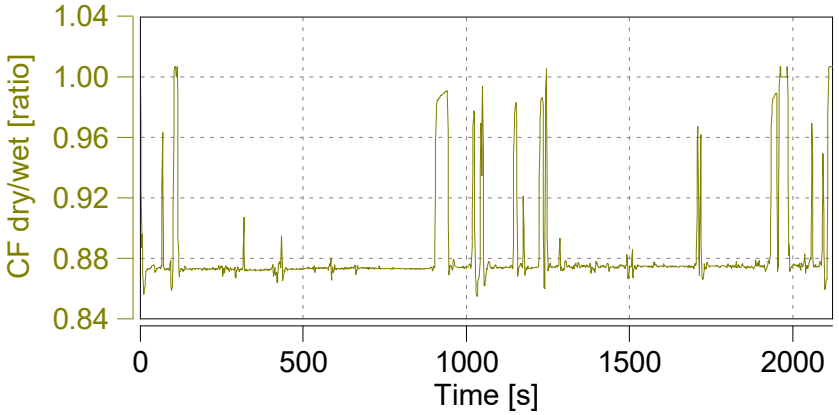
'213-20667 A1 Freeway East'
Start Date: 04/14/2022
Start Time: 10:01:13.0

AVL
Concerto M.O.V.E, 2019









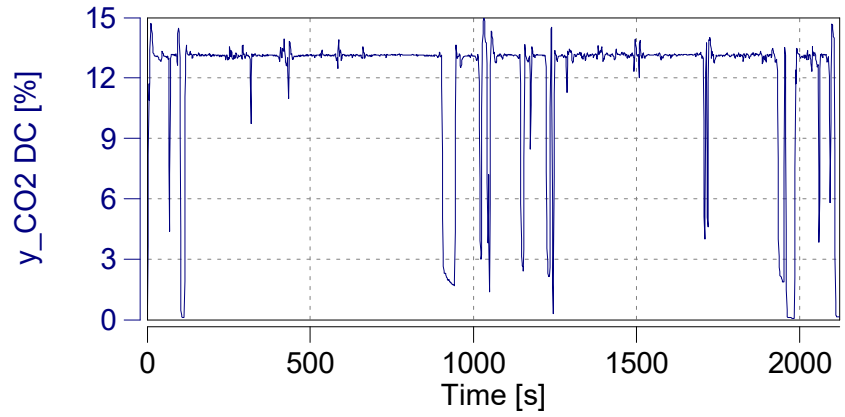
Concerto Version: 505 Build 171, Serial Number: 1604
M.O.V.E Post-Processing: DT_1R4.1_B340
Legislation:

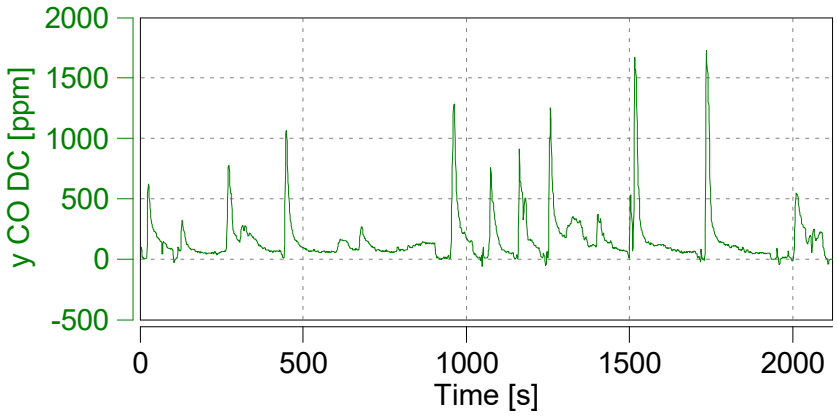
Vehicle: 213-20667 /
Engine: /
NOx Ambient Condition Corr.: 7 - CFR40 §1065.670
Dry / Wet Corr.: 2 - CFR40 §86.1342-90

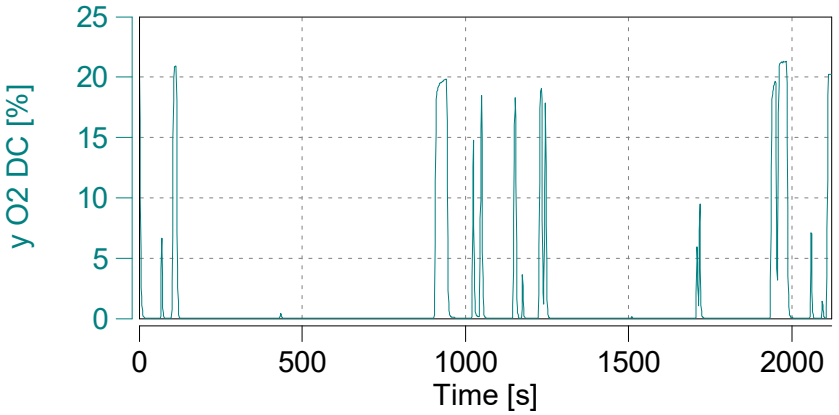
Case: 213-20667
Page: Corrected Emissions (1)

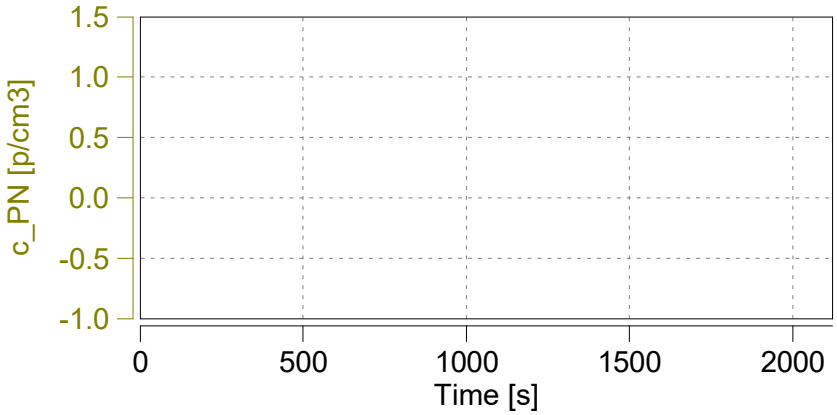
'213-20667 A1 Freeway East'
Start Date: 04/14/2022
Start Time: 10:01:13.0

AVL
Concerto M.O.V.E, 2019









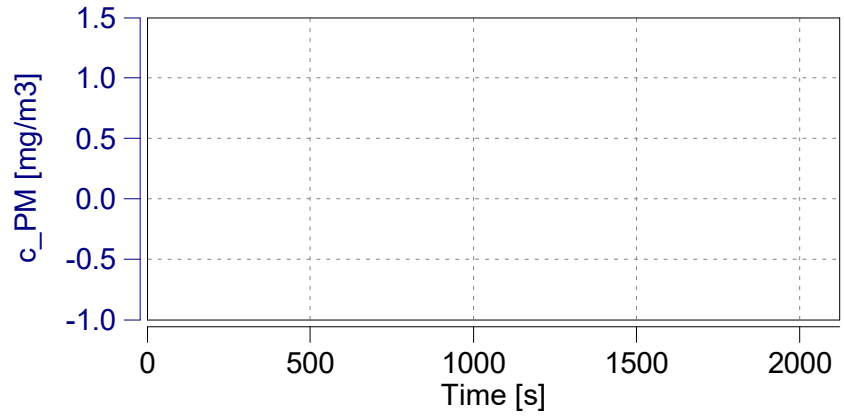
Concerto Version: 505 Build 171, Serial Number: 1604
M.O.V.E Post-Processing: DT_1R4.1_B340
Legislation:

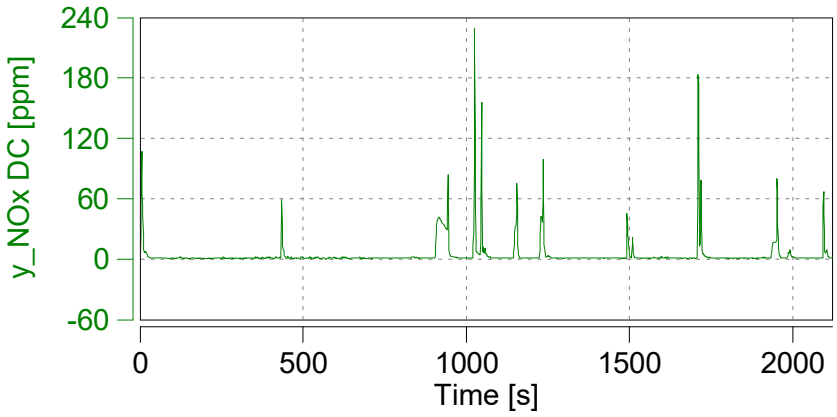
Vehicle: 213-20667 /
Engine: /
NOx Ambient Condition Corr.: 7 - CFR40 §1065.670
Dry / Wet Corr.: 2 - CFR40 §86.1342-90

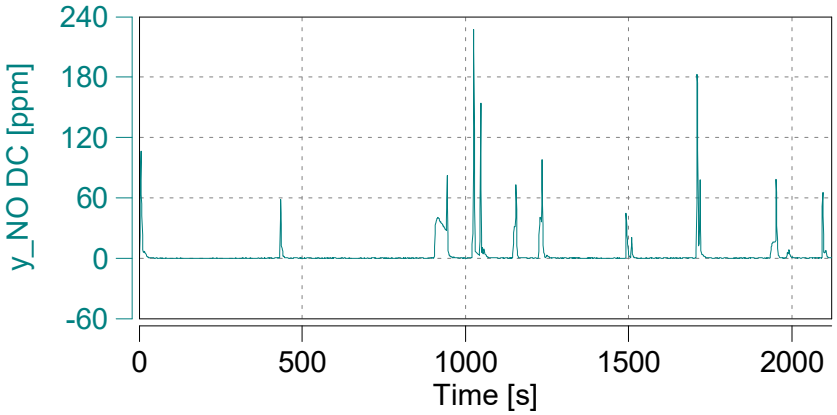
Case: 213-20667
Page: Corrected Emissions (2)

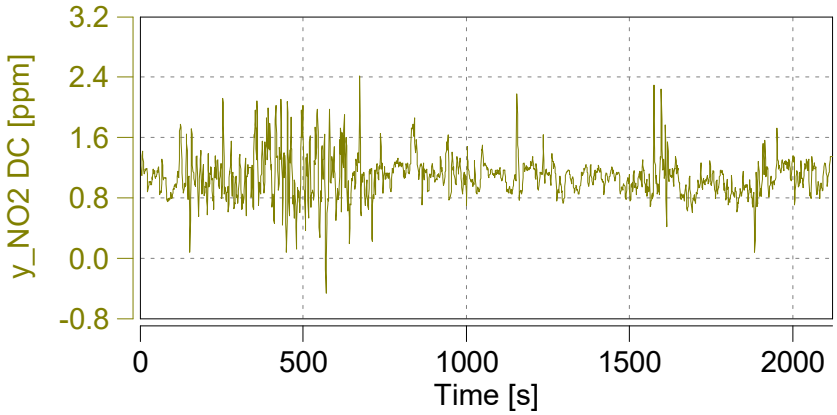
'213-20667 A1 Freeway East'
Start Date: 04/14/2022
Start Time: 10:01:13.0

AVL
Concerto M.O.V.E, 2019









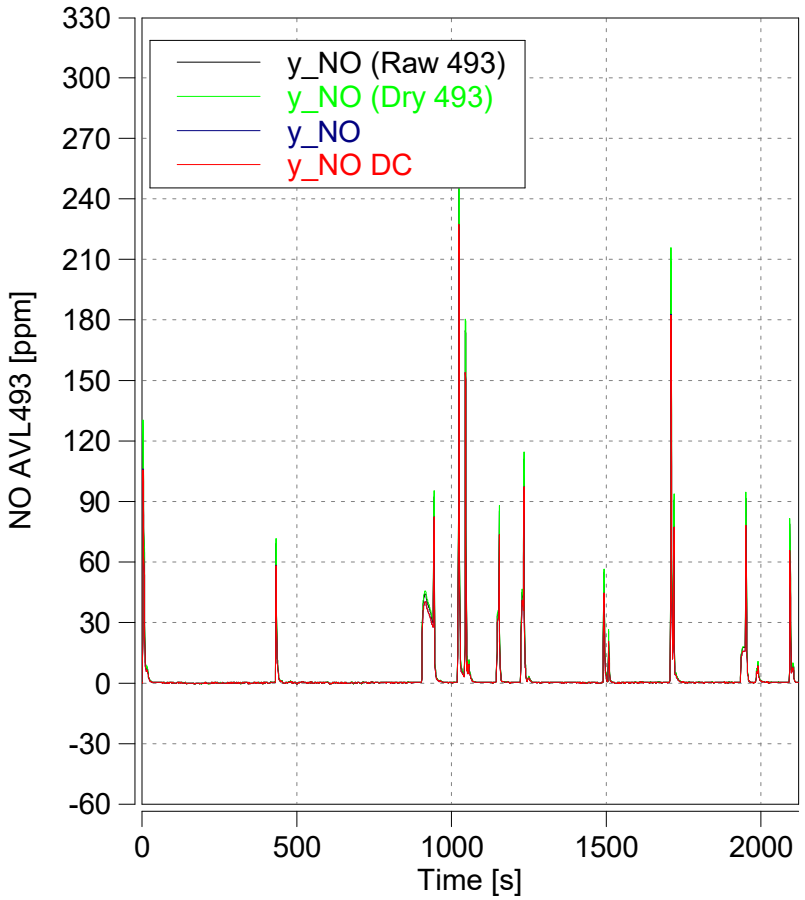
Concerto Version: 505 Build 171, Serial Number: 1604
M.O.V.E Post-Processing: DT_1R4.1_B340
Legislation:

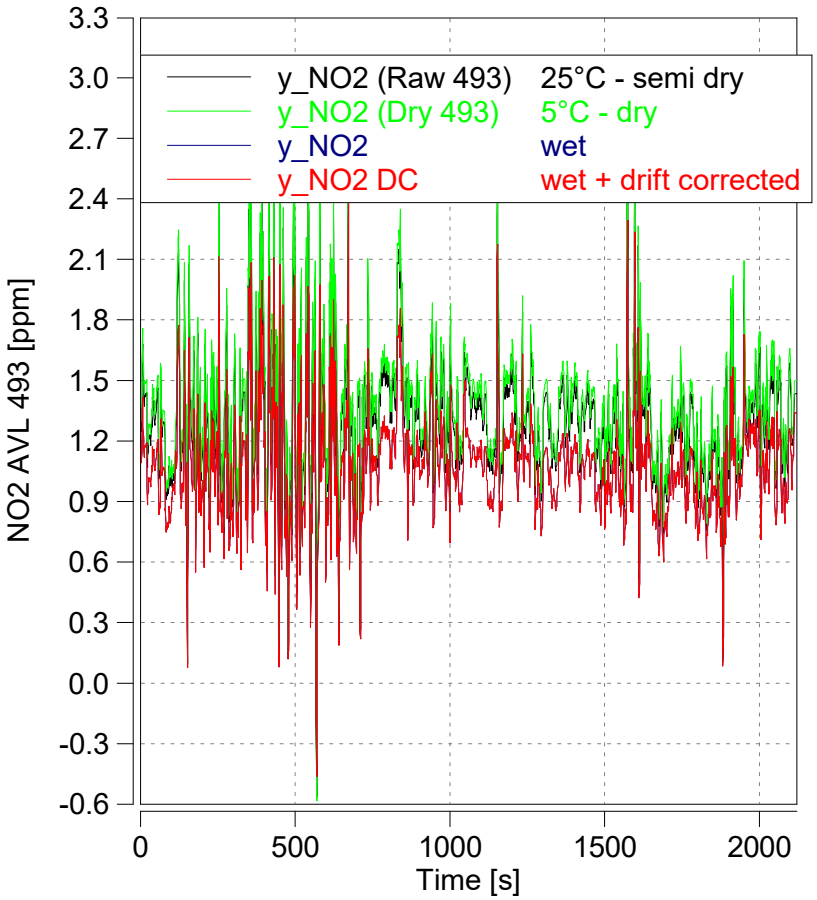
Vehicle: 213-20667 /
Engine: /
NOx Ambient Condition Corr.: 7 - CFR40 §1065.670
Dry / Wet Corr.: 2 - CFR40 §86.1342-90

Case: 213-20667
Page: Corrected Emissions (3)

'213-20667 A1 Freeway East'
Start Date: 04/14/2022
Start Time: 10:01:13.0

AVL
Concerto M.O.V.E, 2019





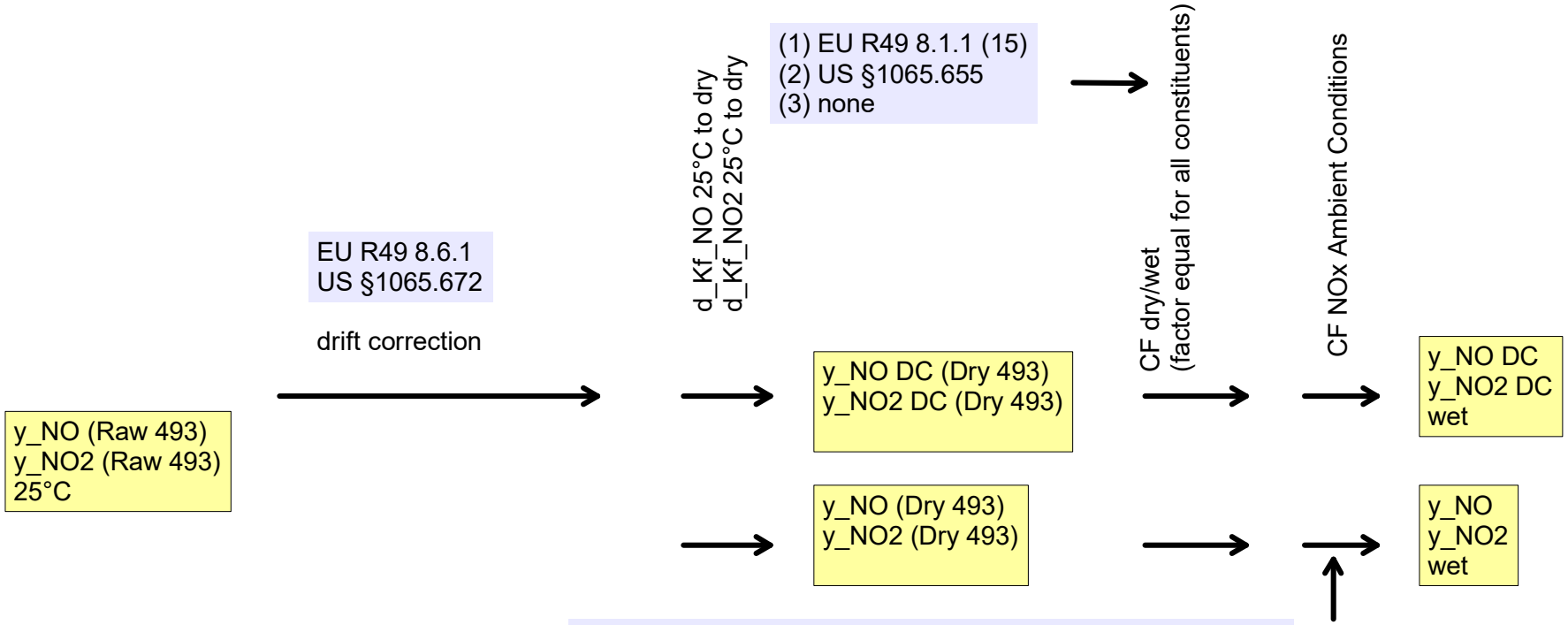
Concerto Version: 505 Build 171, Serial Number: 1604
M.O.V.E Post-Processing: DT_1R4.1_B340
Legislation:

Vehicle: 213-20667 /
Engine: /
NOx Ambient Condition Corr.: 7 - CFR40 §1065.670
Dry / Wet Corr.: 2 - CFR40 §86.1342-90

'213-20667 A1 Freeway East'
Start Date: 04/14/2022
Start Time: 10:01:13.0

AVL
Concerto M.O.V.E, 2019

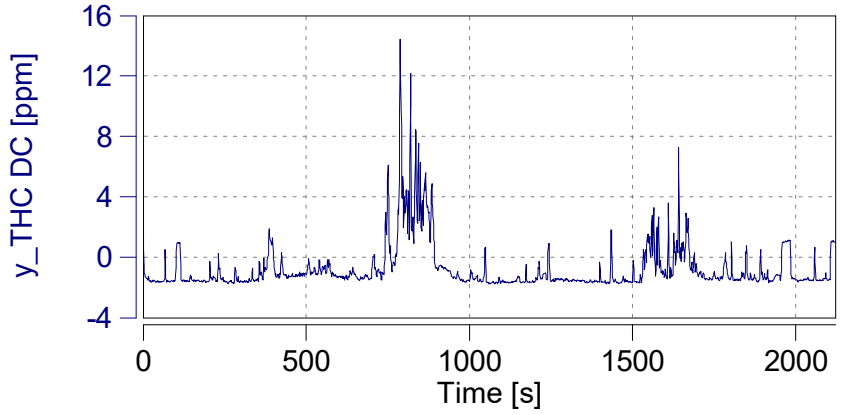
NOx - AVL 493

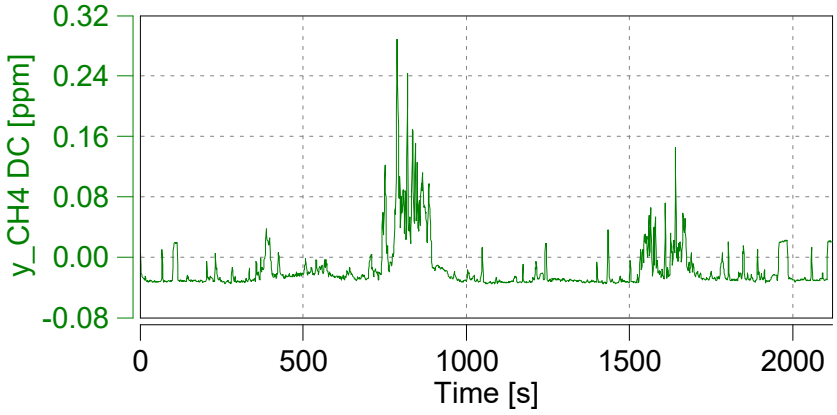


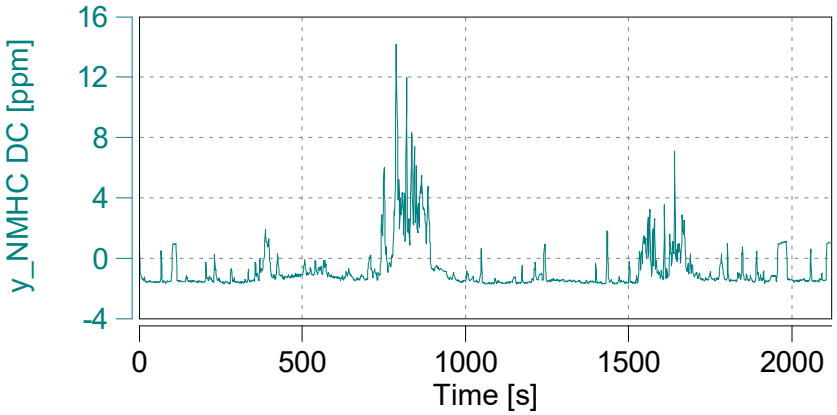
Case: 213-20667
Page: Corrected Emissions (5)

'213-20667 A1 Freeway East'
Start Date: 04/14/2022
Start Time: 10:01:13.0

AVL
Concerto M.O.V.E, 2019







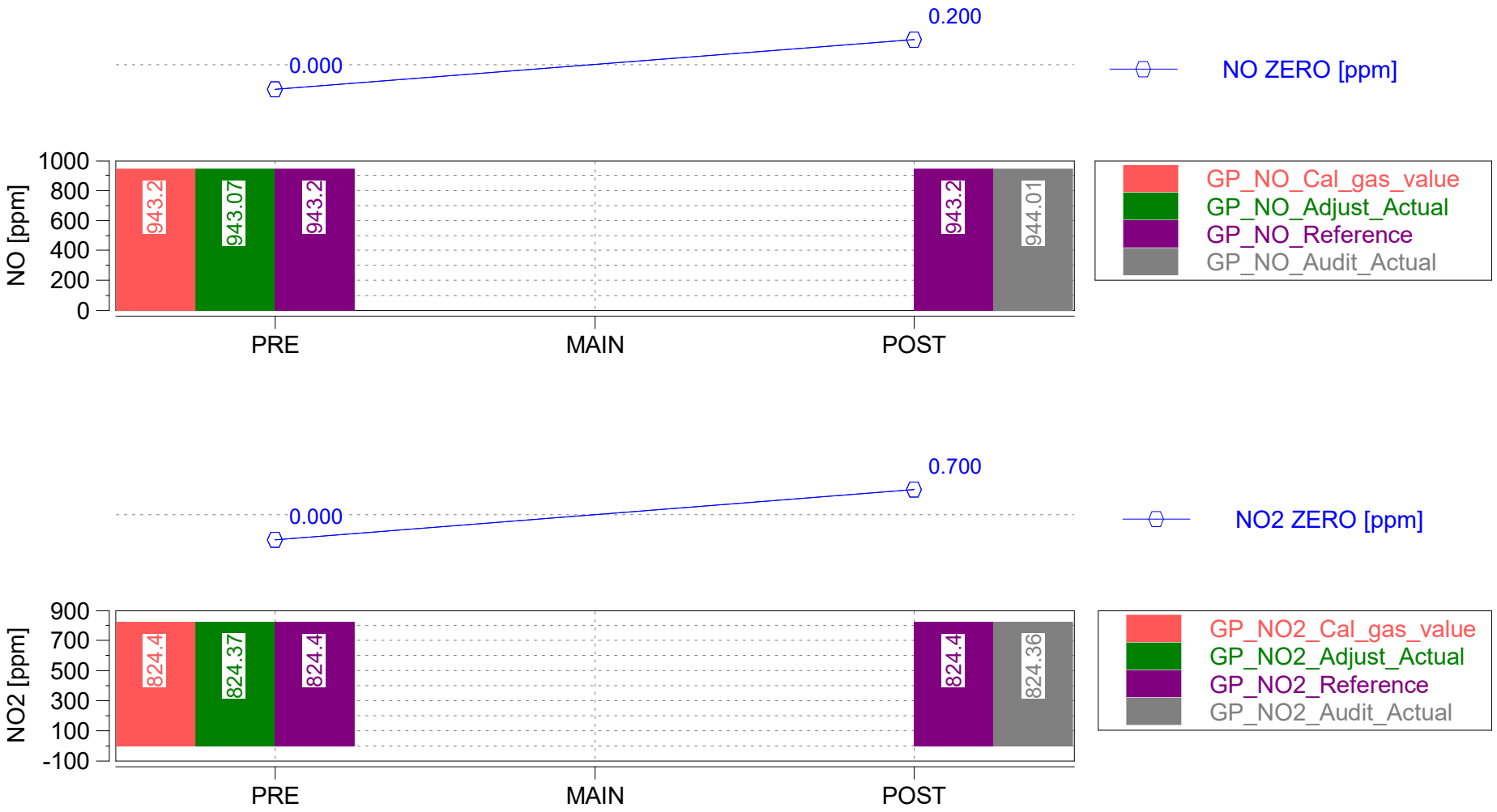
Concerto Version: 505 Build 171, Serial Number: 1604
M.O.V.E Post-Processing: DT_1R4.1_B340
Legislation:

Vehicle: 213-20667 /
Engine: /
NOx Ambient Condition Corr.: 7 - CFR40 §1065.670
Dry / Wet Corr.: 2 - CFR40 §86.1342-90

Case: 213-20667
Page: NO/NO2/NOx Zero - Span

'213-20667 A1 Freeway East'
Start Date: 04/14/2022
Start Time: 10:01:13.0

AVL
Concerto M.O.V.E, 2019



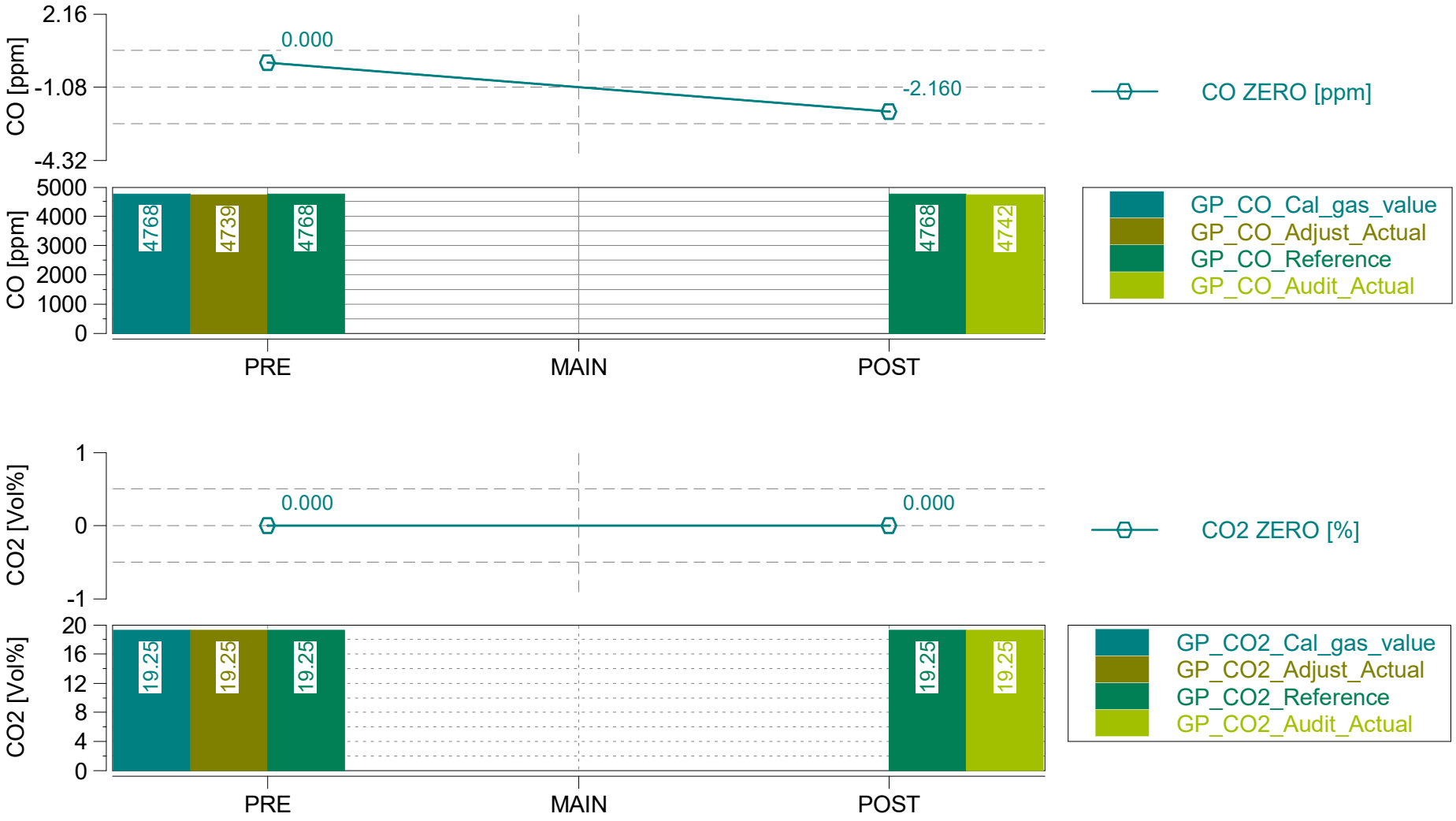
Concerto Version: 505 Build 171, Serial Number: 1604
M.O.V.E Post-Processing: DT_1R4.1_B340
Legislation:

Vehicle: 213-20667 /
Engine: /
NOx Ambient Condition Corr.: 7 - CFR40 §1065.670
Dry / Wet Corr.: 2 - CFR40 §86.1342-90

Case: 213-20667
Page: CO/CO2 Zero - Span

'213-20667 A1 Freeway East'
Start Date: 04/14/2022
Start Time: 10:01:13.0

AVL
Concerto M.O.V.E, 2019



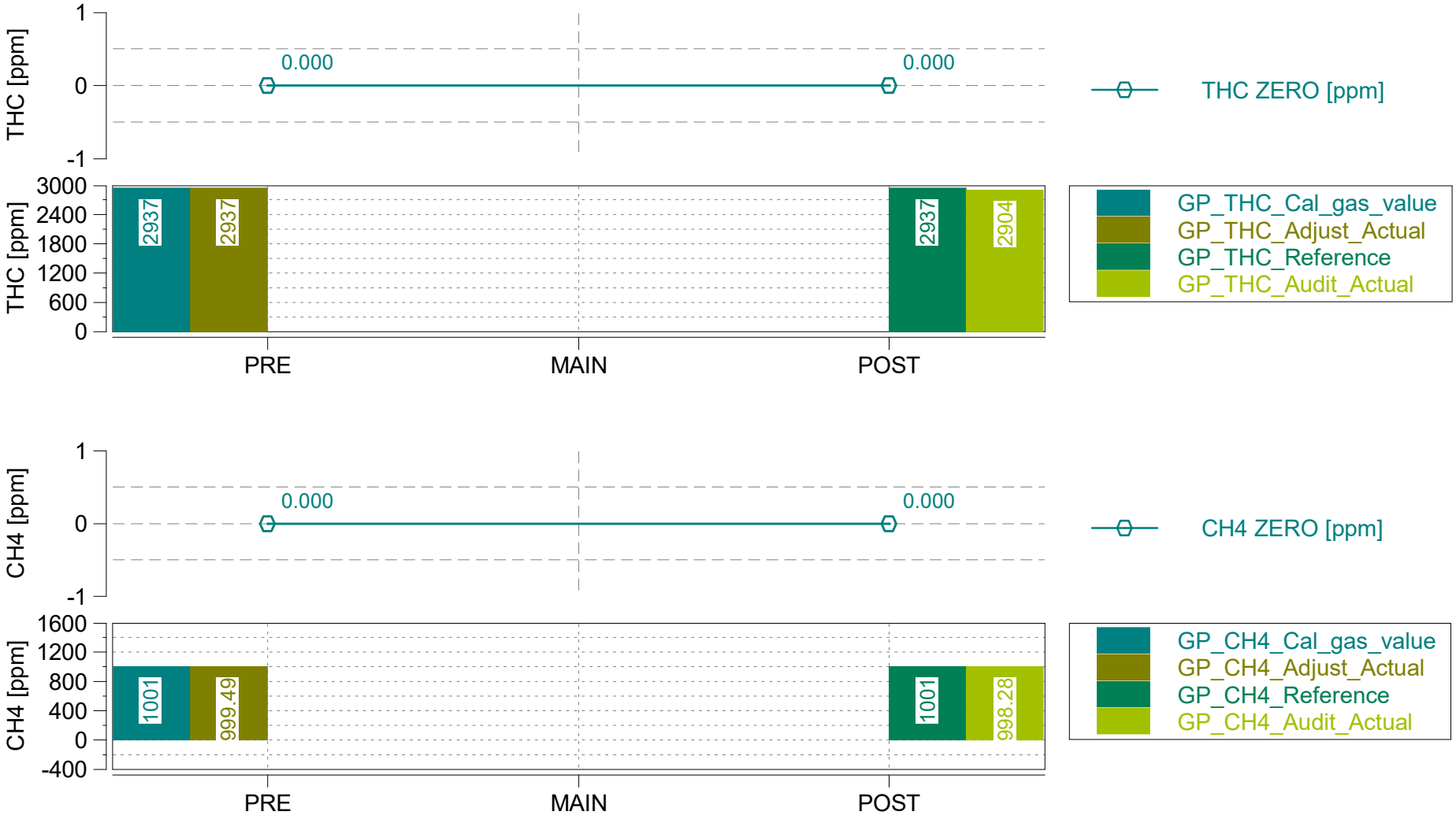
Concerto Version: 505 Build 171, Serial Number: 1604
M.O.V.E Post-Processing: DT_1R4.1_B340
Legislation:

Vehicle: 213-20667 /
Engine: /
NOx Ambient Condition Corr.: 7 - CFR40 §1065.670
Dry / Wet Corr.: 2 - CFR40 §86.1342-90

Case: 213-20667
Page: THC/CH4 Zero - Span

'213-20667 A1 Freeway East'
Start Date: 04/14/2022
Start Time: 10:01:13.0

AVL
Concerto M.O.V.E, 2019



Concerto Version: 505 Build 171, Serial Number: 1604
M.O.V.E Post-Processing: DT_1R4.1_B340
Legislation:

Vehicle: 213-20667 /
Engine: /
NOx Ambient Condition Corr.: 7 - CFR40 §1065.670
Dry / Wet Corr.: 2 - CFR40 §86.1342-90

§	criterium	condition	value	unit	pass/fail
GAS Leak Check	The leakage rate on the vacuum side shall not exceed 0.5 per cent of the in-use flow rate for the portion of the system being checked.	The leakage rate <= 0.5%	**0.00**	**%**	pass
PN Leak Check	n/a	n/a	**n/a**	**n/a**	n/a
PM Leak Check	n/a	n/a	**n/a**	**n/a**	n/a

GAS PEMS Devices

Device ID	AVL492
Serial Number	0625
Firmware Version	V1.17
Main Test Date	2022-04-14
Leak Check Age [days]	0

Device ID	AVL4925iS
Serial Number	184
Firmware Version	1.22.0.4

EFM

Device ID	AVL495
Serial Number	00826
Serial Number Tube	01080
Firmware Version	V1.16

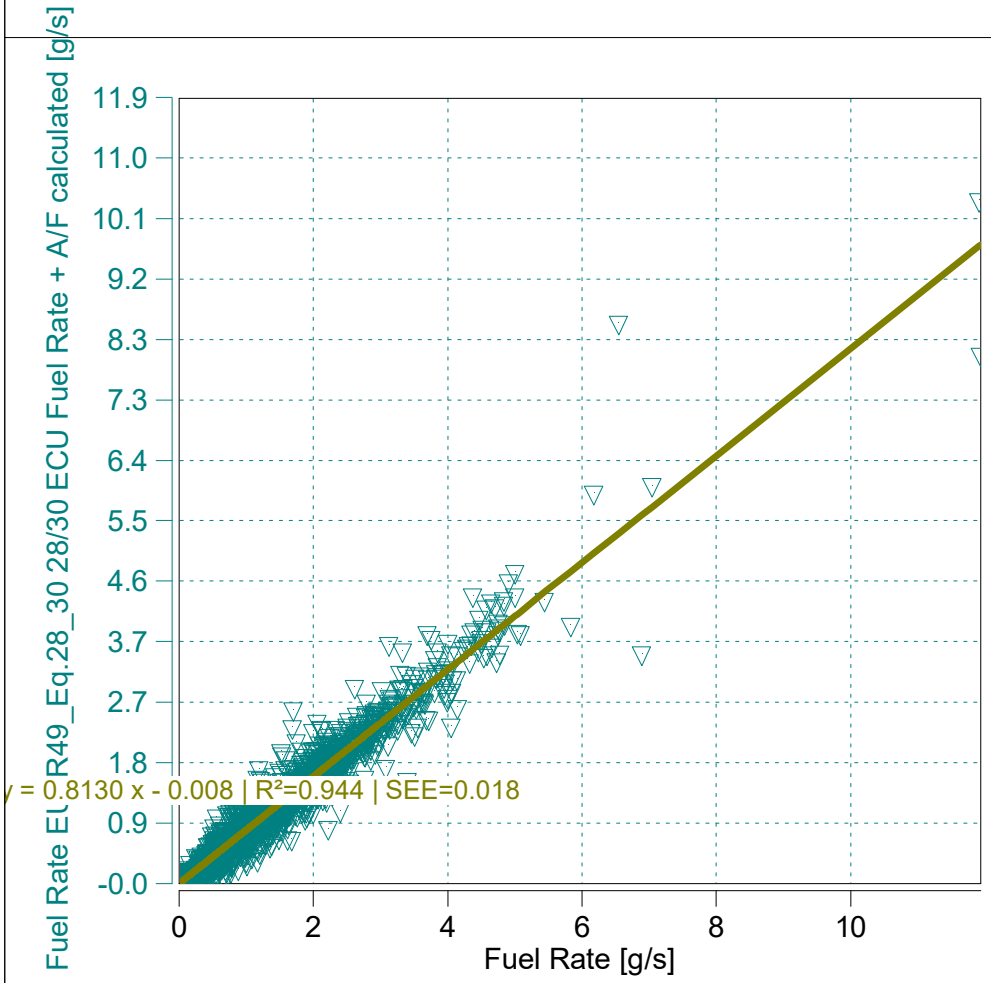
System Control

SC Version	V2.9_237
SC Serial Number	60300923

Case: 213-20667
Page: Fuel Rate ECU vs. Calculated

'213-20667 A1 Freeway East'
Start Date: 04/14/2022
Start Time: 10:01:13.0

AVL
Concerto M.O.V.E, 2019



EU 582/2011/Appendix I/3.2.1 | Fuel Rate ECU and calculated

y = 0.8130 x - 0.008 | R²=0.944 | SEE=0.018
m = 0.81 (0.9 - 1.1 recommended)
R² = 0.94 (min 0.9 mandatory)

Data from - to [% of Maximum]

0 100

Concerto Version: 505 Build 171, Serial Number: 1604
M.O.V.E Post-Processing: DT_1R4.1_B340
Legislation:

Vehicle: 213-20667 /
Engine: /
NOx Ambient Condition Corr.: 7 - CFR40 §1065.670
Dry / Wet Corr.: 2 - CFR40 §86.1342-90

Case: 213-20667
Page: Trip Summary

'213-20667 B2 Freeway West'
Start Date: 04/14/2022
Start Time: 10:01:13.0

AVL
Concerto M.O.V.E, 2019

Trip Duration	1981.00	s
Trip Duration (a)	1981.00	s
Trip Distance	28.63	mi
Trip Distance (a)	28.63	mi
Trip Fuel Cons. (b)	2.32	kg
Trip Fuel Cons. (ab)	2.32	kg
Trip Fuel Cons. EU (ac)	1.88	kg
Trip Fuel Cons. US (ac)	1.88	kg
Trip Fuel Economy (b)	34.96	mpg_US
Trip Fuel Economy (ab)	34.96	mpg_US
Trip Fuel Economy EU (ac)	42.99	mpg_US
Trip Fuel Economy US (ac)	43.04	mpg_US
Trip Fuel Economy GGE (b)	34.96	mpg_US
Trip Fuel Economy GGE (ab)	34.96	mpg_US
Trip Fuel Economy EU GGE (ac)	42.99	mpg_US
Trip Fuel Economy US GGE (ac)	43.04	mpg_US
Trip Av. Eng. Speed	1345.30	rpm
Trip Av. Torque	78.13	lbft
Trip Av. Power	21.88	hp
Trip Work		
Trip Work (a)	12.04	hphr
Trip Exhaust Mass	28.79	kg
Trip Exhaust Mass EU (ac)	35.51	kg
Trip Exhaust Mass US (ac)	35.56	kg
Trip Av. Amb. Temperature	77.18	deg_F
Trip Av. Humidity	21.63	%
Trip Av. GPS Altitude	204.26	m
Fuel Type	Petrol (E10)	

ave THC	-1.50432	ppm
ave NMHC	-1.47423	ppm
ave CH4	-0.03009	ppm
ave CO	156.14726	ppm
ave CO2	12.52479	%
ave NOx	2.69358	ppm
ave PM	n/a	mg/m3
ave Soot meas	n/a	mg/m3
ave Soot	n/a	mg/m3
ave PN	n/a	#/cm3
tot THC	0.00013	g
tot NMHC	0.00012	g
tot CH4	0.00000	g
tot CO	4.42719	g
tot CO2	5723.06490	g
tot NO (d)	0.04067	g
tot NO2	0.05859	g
tot NOx	0.09902	g
tot Soot	n/a	g
tot Soot meas	n/a	g
tot PM	n/a	g
tot PN	n/a	#
PM measurement type	0.00000	-
tot Soot on PM filter (estim.)	0.00000	mg
Soot --> PM simple scaling factor	1.00000	-
Trip Av. Veh. Speed	52.03717	mi/hr
Trip Distance Share Urban	8.35300	% distanc
Trip Distance Share Rural	15.41251	% distanc
Trip Distance Share Motorway	76.23449	% distanc

BS CO2	475.37684	g/hphr
BS CO	0.36774	g/hphr
BS THC	0.00001	g/hphr
BS NMHC	0.00001	g/hphr
BS CH4	0.00000	g/hphr
BS NO (d)	0.00338	g/hphr
BS NO2	0.00487	g/hphr
BS NOx	0.00823	g/hphr
BS Soot	n/a	g/hphr
BS Soot meas	n/a	g/hphr
BS PM	n/a	g/hphr
BS PN	n/a	#/hpr
DS CO2	199.86328	g/mi
DS CO	0.15461	g/mi
DS THC	0.00000	g/mi
DS NMHC	0.00000	g/mi
DS CH4	0.00000	g/mi
DS NO (d)	0.00142	g/mi
DS NO2	0.00205	g/mi
DS NOx	0.00346	g/mi
DS Soot	n/a	g/mi
DS Soot meas	n/a	g/mi
DS PM	n/a	g/mi
DS PN	n/a	#/mi
FS CO2	2469.66765	g/kg
FS CO	1.91046	g/kg
FS THC	0.00006	g/kg
FS NMHC	0.00005	g/kg
FS CH4	0.00000	g/kg
FS NO (d)	0.01755	g/kg
FS NO2	0.02528	g/kg
FS NOx	0.04273	g/kg
FS Soot	n/a	g/kg
FS Soot meas	n/a	g/kg
FS PM	n/a	g/kg
FS PN	n/a	#/kg

(a) GAS PEMS measurement state only, (b) based on fuel rate input (ECU, Fuel Meter), (c) Based on A/F ratio (eq 28-32 - R49)
(d) NO calculated using molecular weight of NO2, GGE=Gasoline Gallon Equivalents

Concerto Version: 505 Build 171, Serial Number: 1604
M.O.V.E Post-Processing: DT_1R4.1_B340
Legislation:

Vehicle: 213-20667 /
Engine: /
NOx Ambient Condition Corr.: 7 - CFR40 §1065.670
Dry / Wet Corr.: 2 - CFR40 §86.1342-90

Case: 213-20667
Page: Trip Summary Drift Corrected

'213-20667 B2 Freeway West'
Start Date: 04/14/2022
Start Time: 10:01:13.0

AVL
Concerto M.O.V.E, 2019

Trip Duration	1981.00	s
Trip Duration (a)	1981.00	s
Trip Distance	28.63	mi
Trip Distance (a)	28.63	mi
Trip Fuel Cons. (b)	2.32	kg
Trip Fuel Cons. (ab)	2.32	kg
Trip Fuel Cons. EU (ac)	1.88	kg
Trip Fuel Cons. US (ac)	1.88	kg
Trip Fuel Economy (b)	34.96	mpg_US
Trip Fuel Economy (ab)	34.96	mpg_US
Trip Fuel Economy EU (ac)	42.99	mpg_US
Trip Fuel Economy US (ac)	43.04	mpg_US
Trip Fuel Economy GGE (b)	34.96	mpg_US
Trip Fuel Economy GGE (ab)	34.96	mpg_US
Trip Fuel Economy EU GGE (ac)	42.99	mpg_US
Trip Fuel Economy US GGE (ac)	43.04	mpg_US
Trip Av. Eng. Speed	1345.30	rpm
Trip Av. Torque	78.13	lbft
Trip Av. Power	21.88	hp
Trip Work		
Trip Work (a)	12.04	hphr
Trip Exhaust Mass	28.79	kg
Trip Exhaust Mass EU (ac)	35.51	kg
Trip Exhaust Mass US (ac)	35.56	kg
Trip Av. Amb. Temperature	77.18	deg_F
Trip Av. Humidity	21.63	%
Trip Av. GPS Altitude	204.26	m
Fuel Type	Petrol (E10)	

ave THC DC	-1.51294	ppm
ave NMHC DC	-1.48268	ppm
ave CH4 DC	-0.03026	ppm
ave CO DC	157.03801	ppm
ave CO2 DC	12.52479	%
ave NOx DC	2.69313	ppm
ave PM	n/a	mg/m3
ave Soot meas	n/a	mg/m3
ave Soot	n/a	mg/m3
ave PN DC		
tot THC DC	0.00013	g
tot NMHC DC	0.00012	g
tot CH4 DC	0.00000	g
tot CO DC	4.45245	g
tot CO2 DC	5723.06490	g
tot NO DC (d)	0.04065	g
tot NO2 DC	0.05859	g
tot NOx DC	0.09901	g
tot Soot	n/a	g
tot Soot meas	n/a	g
tot PM	n/a	g
tot PN DC		
PM measurement type	0.00000	-
tot Soot on PM filter (estim.)	0.00000	mg
Soot --> PM simple scaling factor	1.00000	-
Trip Av. Veh. Speed	52.03717	mi/hr
Trip Distance Share Urban	8.35300	% distanc
Trip Distance Share Rural	15.41251	% distanc
Trip Distance Share Motorway	76.23449	% distanc

BS CO2 DC	475.37684	g/hphr
BS CO DC	0.36984	g/hphr
BS THC DC	0.00001	g/hphr
BS NMHC DC	0.00001	g/hphr
BS CH4 DC	0.00000	g/hphr
BS NO DC (d)	0.00338	g/hphr
BS NO2 DC	0.00487	g/hphr
BS NOx DC	0.00822	g/hphr
BS Soot	n/a	g/hphr
BS Soot meas	n/a	g/hphr
BS PM	n/a	g/hphr
BS PN DC		
DS CO2 DC	199.86328	g/mi
DS CO DC	0.15549	g/mi
DS THC DC	0.00000	g/mi
DS NMHC DC	0.00000	g/mi
DS CH4 DC	0.00000	g/mi
DS NO DC (d)	0.00142	g/mi
DS NO2 DC	0.00205	g/mi
DS NOx DC	0.00346	g/mi
DS Soot	n/a	g/mi
DS Soot meas	n/a	g/mi
DS PM	n/a	g/mi
DS PN DC		
FS CO2 DC	2469.66765	g/kg
FS CO DC	1.92136	g/kg
FS THC DC	0.00006	g/kg
FS NMHC DC	0.00005	g/kg
FS CH4 DC	0.00000	g/kg
FS NO DC (d)	0.01754	g/kg
FS NO2 DC	0.02528	g/kg
FS NOx DC	0.04273	g/kg
FS Soot	n/a	g/kg
FS Soot meas	n/a	g/kg
FS PM	n/a	g/kg
FS PN DC		

(a) GAS PEMS measurement state only, (b) based on fuel rate input (ECU, Fuel Meter), (c) Based on A/F ratio (eq 28-32 - R49)
(d) NO calculated using molecular weight of NO2, GGE=Gasoline Gallon Equivalents

Concerto Version: 505 Build 171, Serial Number: 1604
M.O.V.E Post-Processing: DT_1R4.1_B340
Legislation:

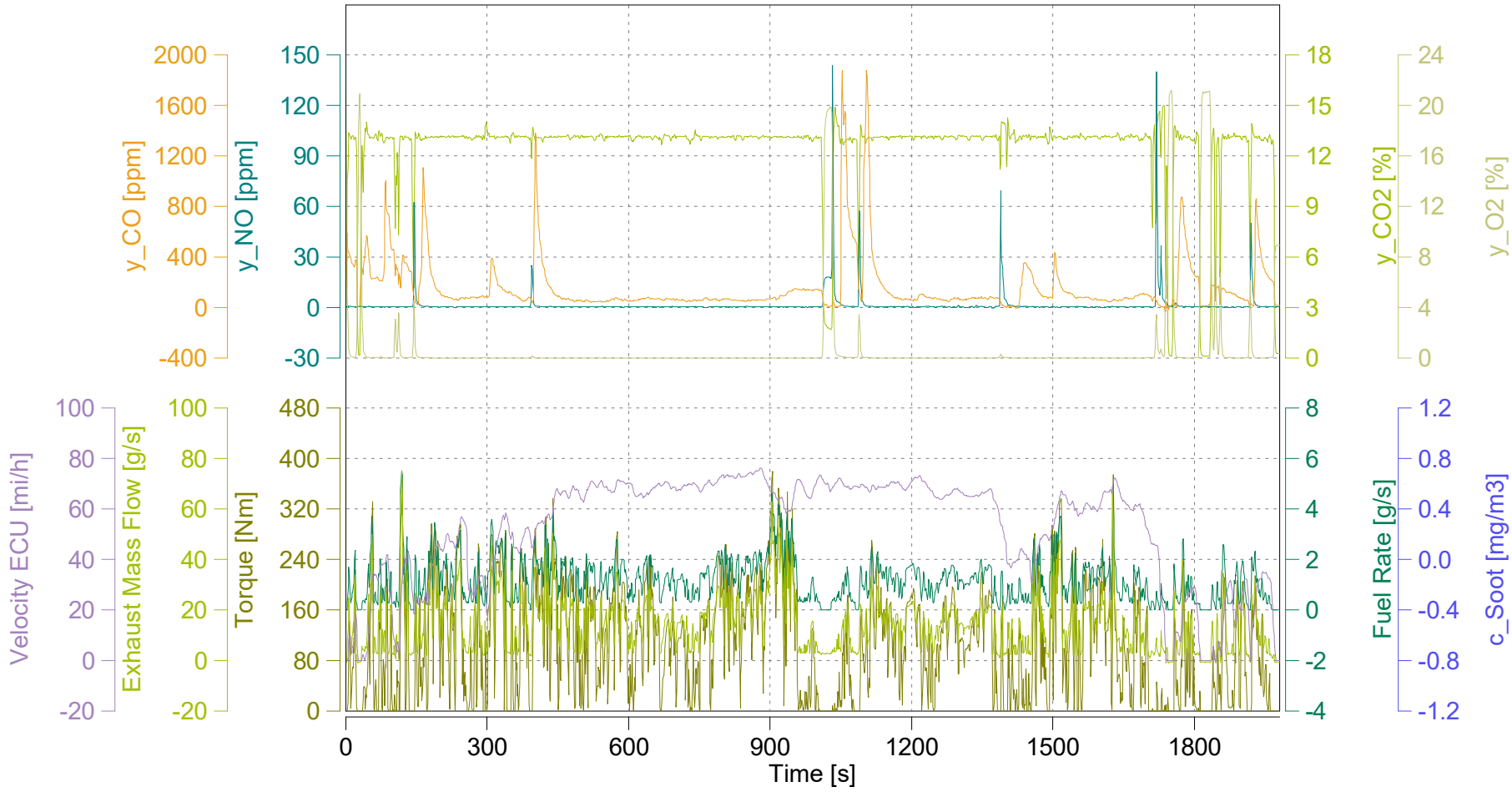
Vehicle: 213-20667 /
Engine: /
NOx Ambient Condition Corr.: 7 - CFR40 §1065.670
Dry / Wet Corr.: 2 - CFR40 §86.1342-90

Case: 213-20667
Page: Time Alignment Check

'213-20667 B2 Freeway West'
Start Date: 04/14/2022
Start Time: 10:01:13.0

AVL

Concerto M.



Absolute Tim

y_THC
y_NO
y_CO2
y_O2
c_Soot
Fuel Rate
Exhaust Mas
Torque
Velocity ECU

AVL 492 De

THC
NO/NO2
CO/CO2
O2

Apply De

Alignment F

Reset Time

Reset A

Apply Cu

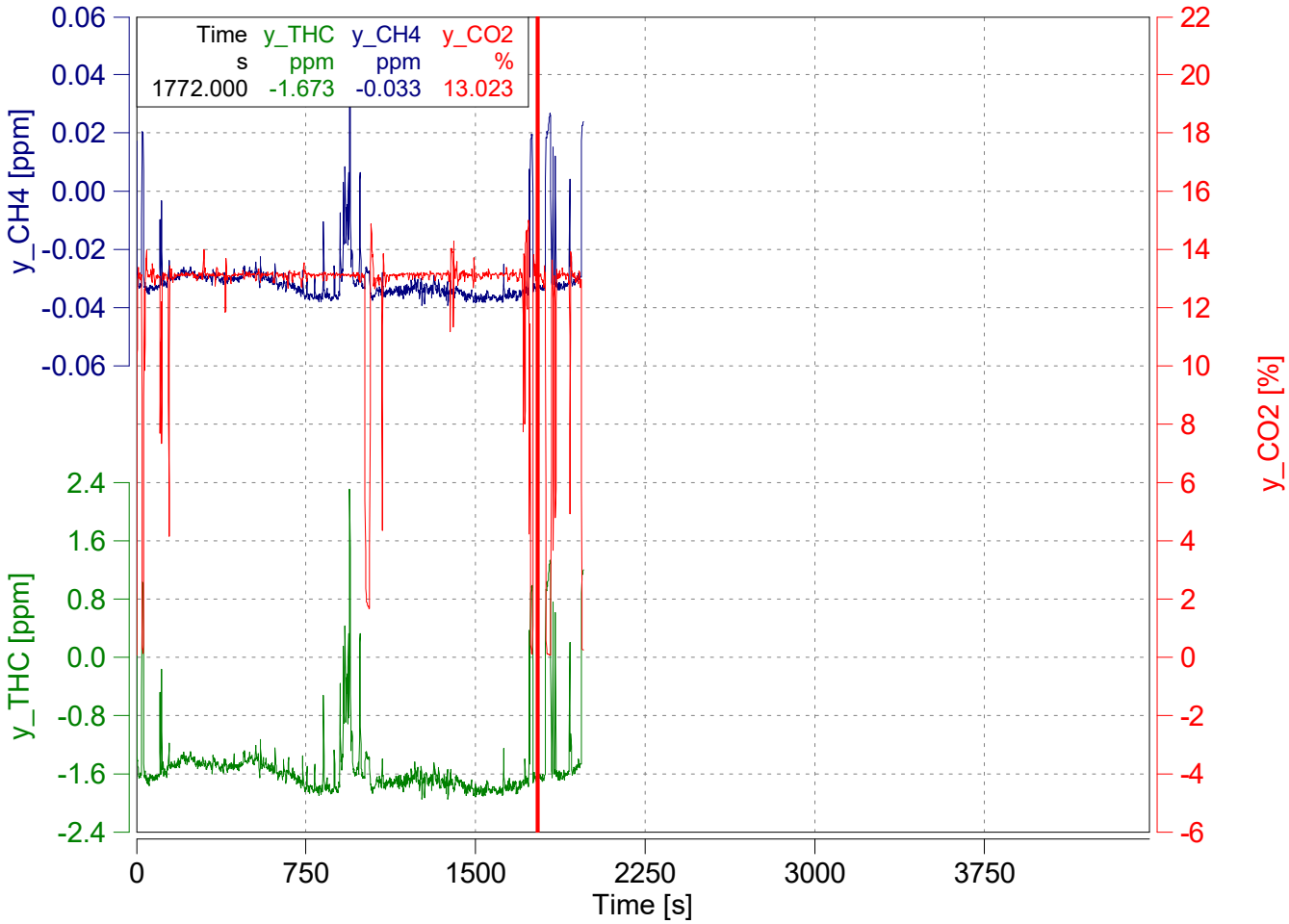
Concerto Version: 505 Build 171, Serial Number: 1604
M.O.V.E Post-Processing: DT_1R4.1_B340
Legislation:

Vehicle: 213-20667 /
Engine: /
NOx Ambient Condition Corr.: 7 - CFR40 §1065.670
Dry / Wet Corr.: 2 - CFR40 §86.1342-90

Case: 213-20667
Page: Time Alignment of Gas Concentrations

'213-20667 B2 Freeway West'
Start Date: 04/14/2022
Start Time: 10:01:13.0

AVL
Concerto M.O.V.E, 2019



Absolute Time Shifts

y_THC	s	-4.3
y_CH4	s	-6.3

Reset Time Shifts in Plot

Apply Current Values

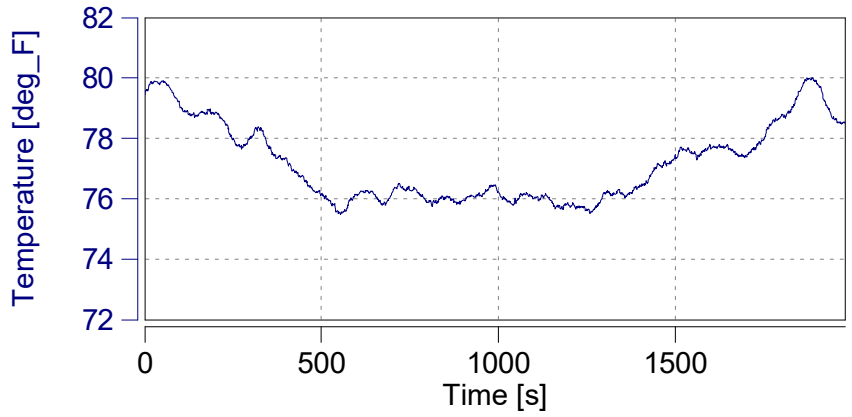
Concerto Version: 505 Build 171, Serial Number: 1604
M.O.V.E Post-Processing: DT_1R4.1_B340
Legislation:

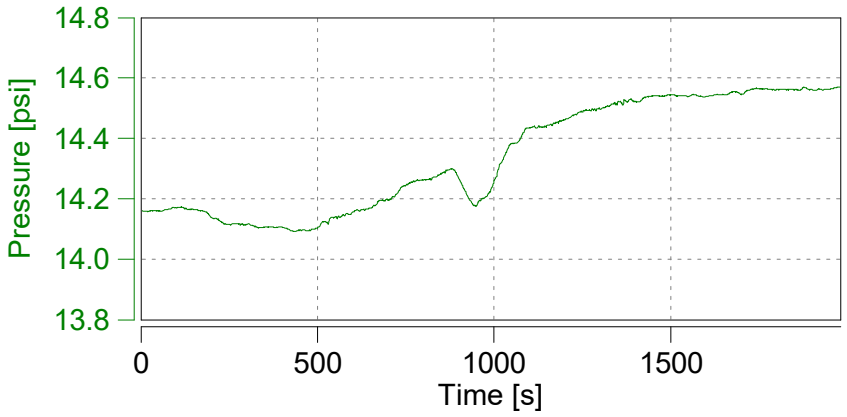
Vehicle: 213-20667 /
Engine: /
NOx Ambient Condition Corr.: 7 - CFR40 §1065.670
Dry / Wet Corr.: 2 - CFR40 §86.1342-90

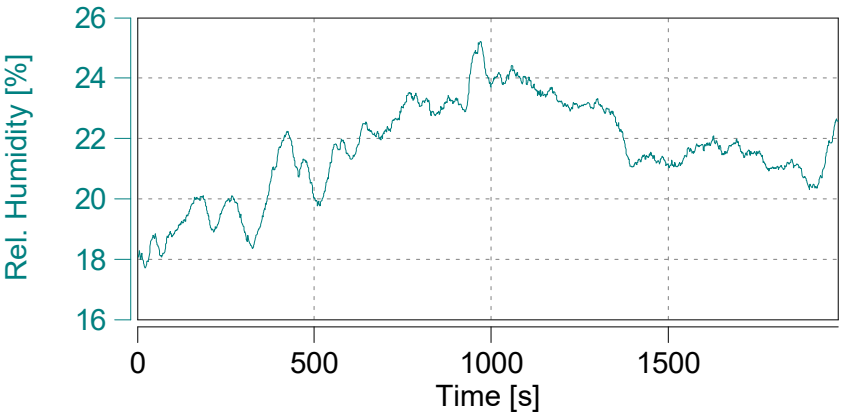
Case: 213-20667
Page: Ambient Conditions

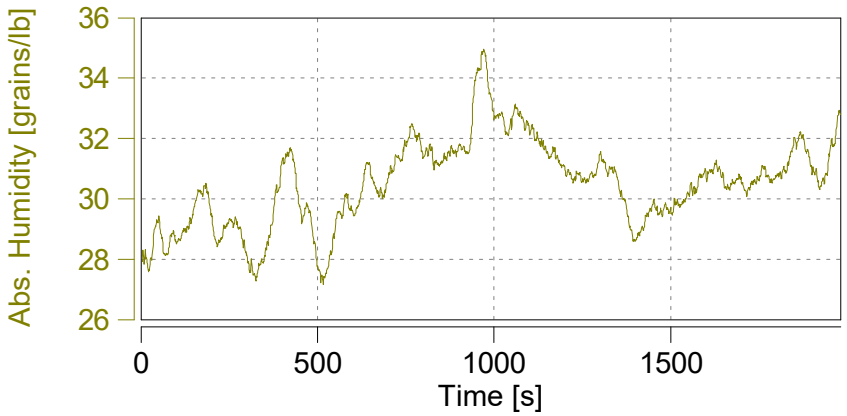
'213-20667 B2 Freeway West'
Start Date: 04/14/2022
Start Time: 10:01:13.0

AVL
Concerto M.O.V.E, 2019









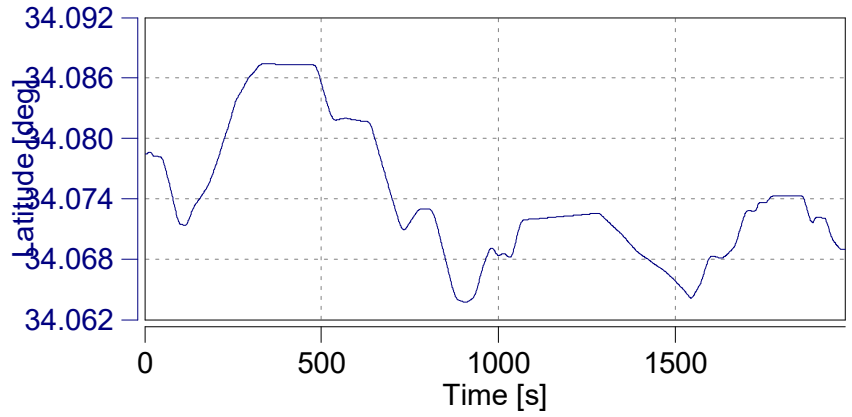
Concerto Version: 505 Build 171, Serial Number: 1604
M.O.V.E Post-Processing: DT_1R4.1_B340
Legislation:

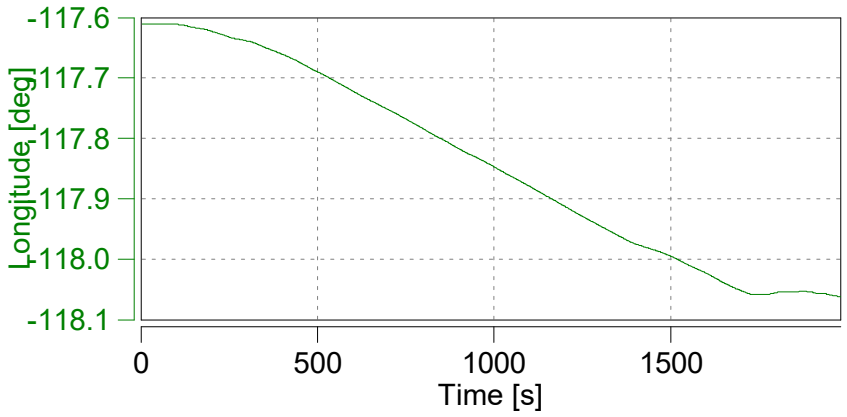
Vehicle: 213-20667 /
Engine: /
NOx Ambient Condition Corr.: 7 - CFR40 §1065.670
Dry / Wet Corr.: 2 - CFR40 §86.1342-90

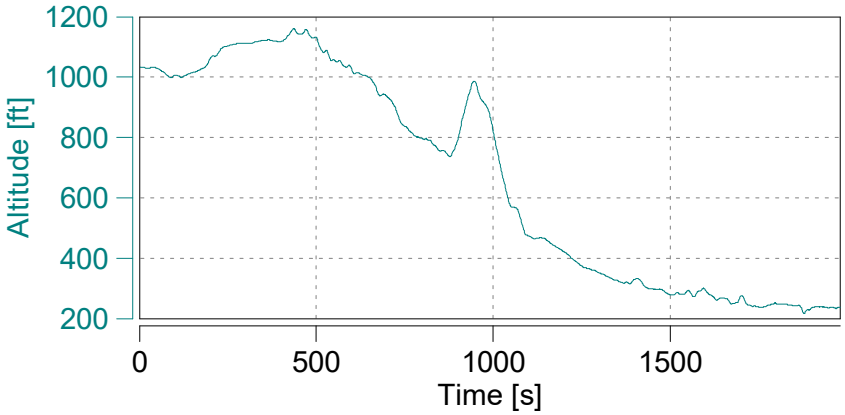
Case: 213-20667
Page: GPS

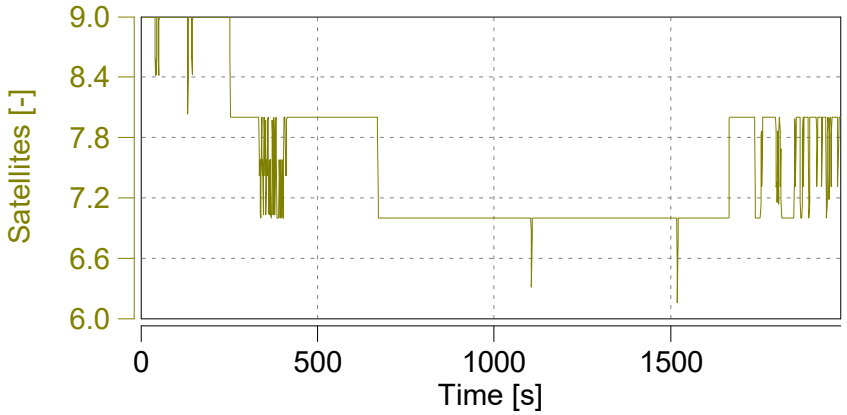
'213-20667 B2 Freeway West'
Start Date: 04/14/2022
Start Time: 10:01:13.0

AVL
Concerto M.O.V.E, 2019









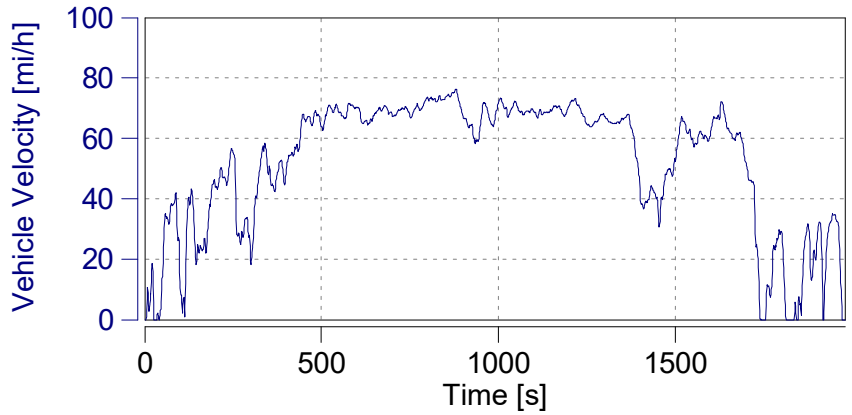
Concerto Version: 505 Build 171, Serial Number: 1604
M.O.V.E Post-Processing: DT_1R4.1_B340
Legislation:

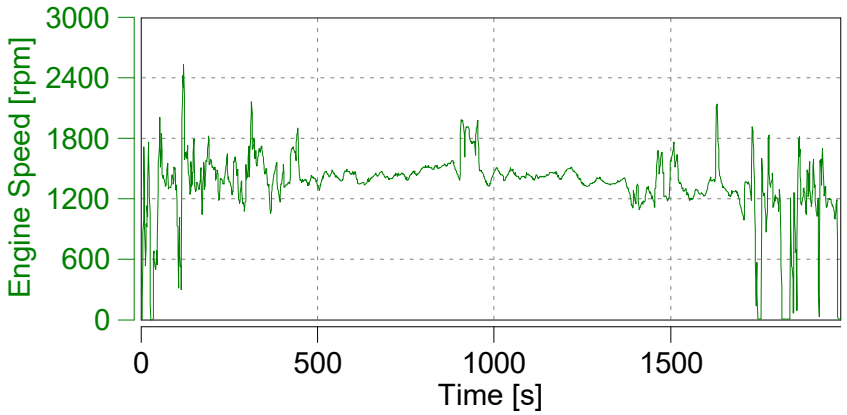
Vehicle: 213-20667 /
Engine: /
NOx Ambient Condition Corr.: 7 - CFR40 §1065.670
Dry / Wet Corr.: 2 - CFR40 §86.1342-90

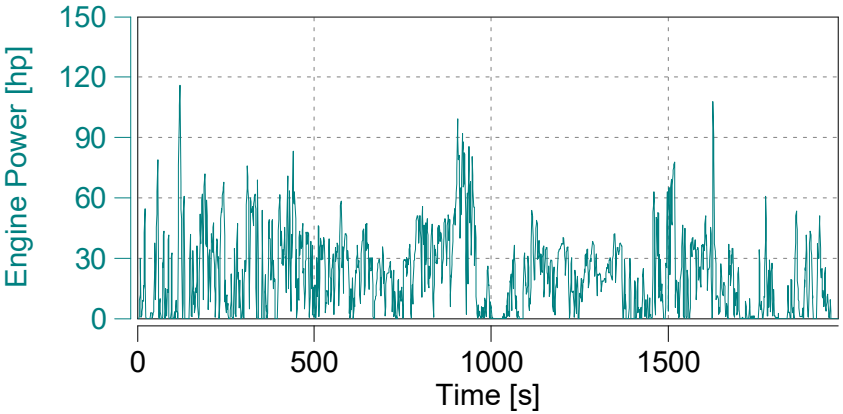
Case: 213-20667
Page: Engine (1)

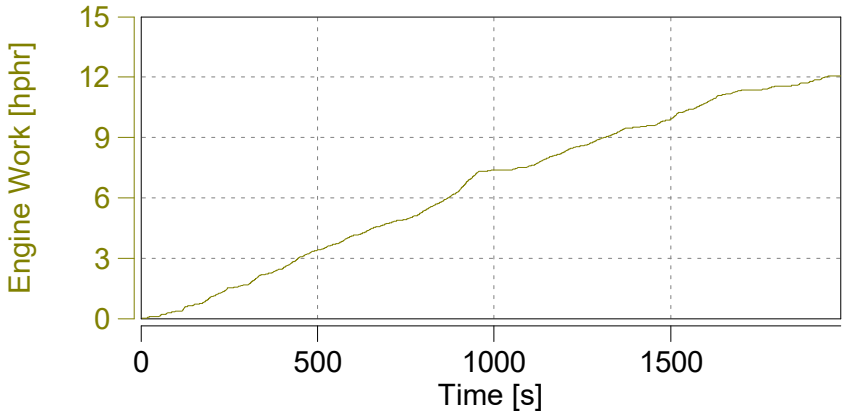
'213-20667 B2 Freeway West'
Start Date: 04/14/2022
Start Time: 10:01:13.0

AVL
Concerto M.O.V.E, 2019







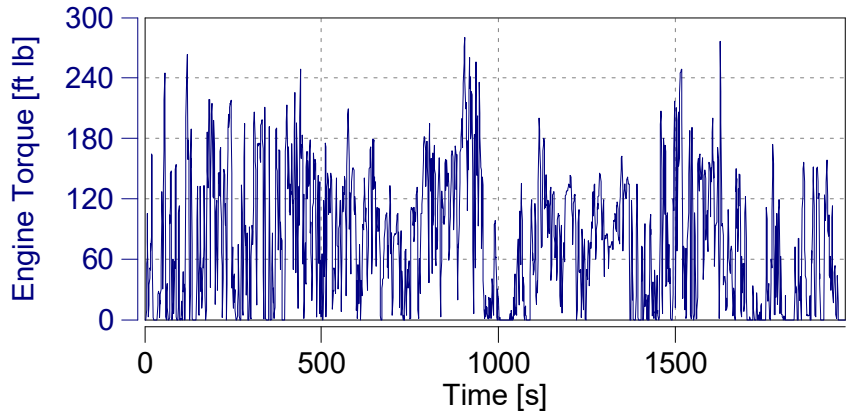


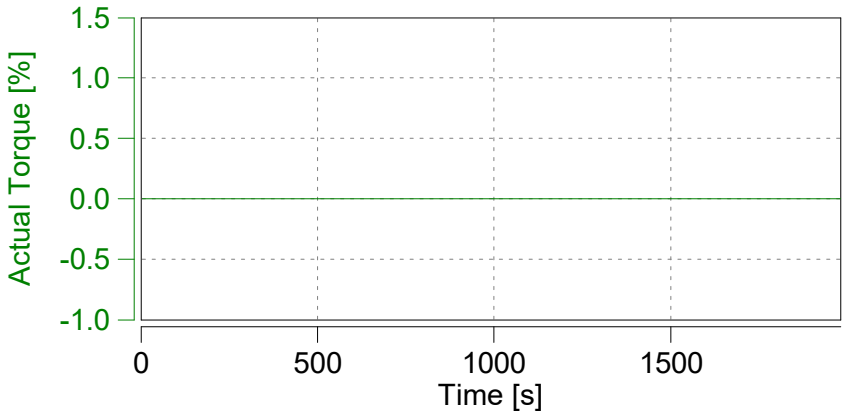
Concerto Version: 505 Build 171, Serial Number: 1604
M.O.V.E Post-Processing: DT_1R4.1_B340
Legislation:

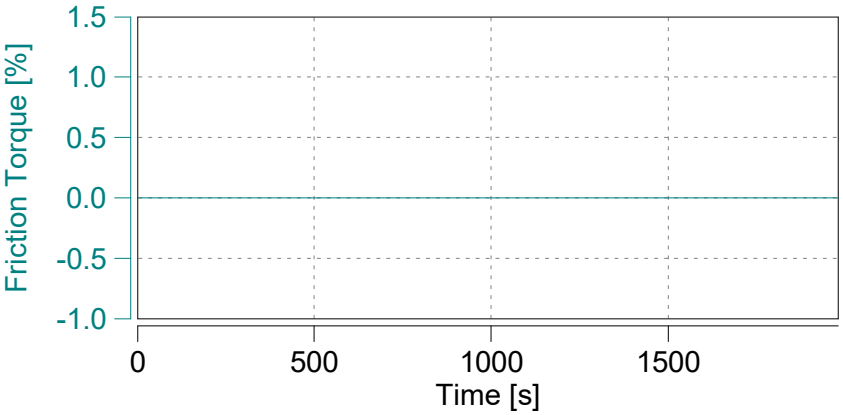
Vehicle: 213-20667 /
Engine: /
NOx Ambient Condition Corr.: 7 - CFR40 §1065.670
Dry / Wet Corr.: 2 - CFR40 §86.1342-90

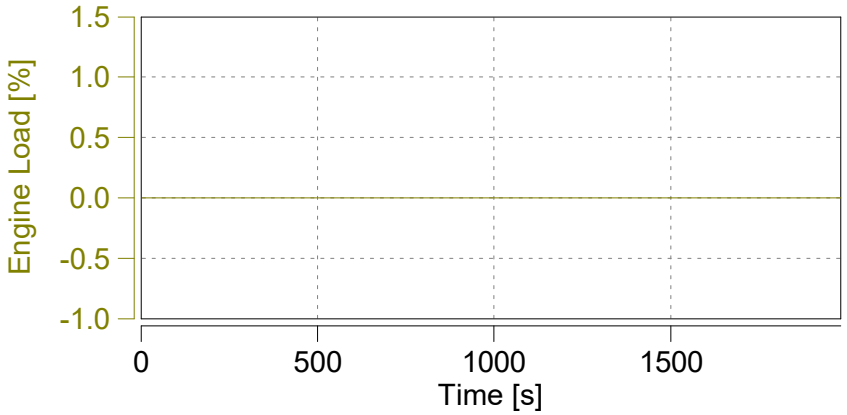
'213-20667 B2 Freeway West'
Start Date: 04/14/2022
Start Time: 10:01:13.0

Concerto M.O.V.E, 2019







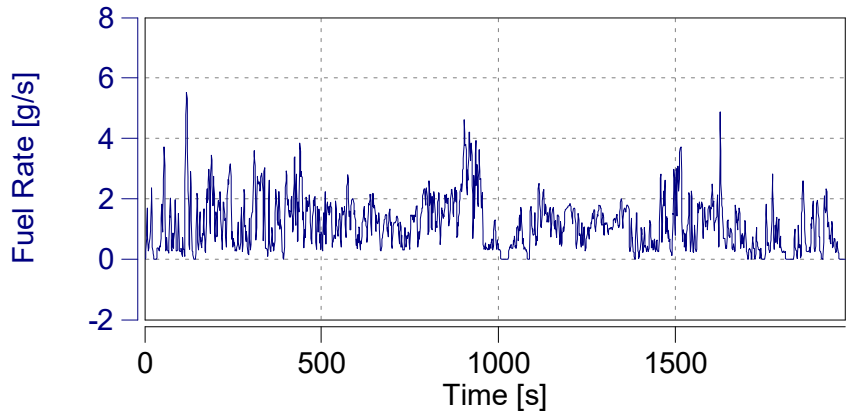


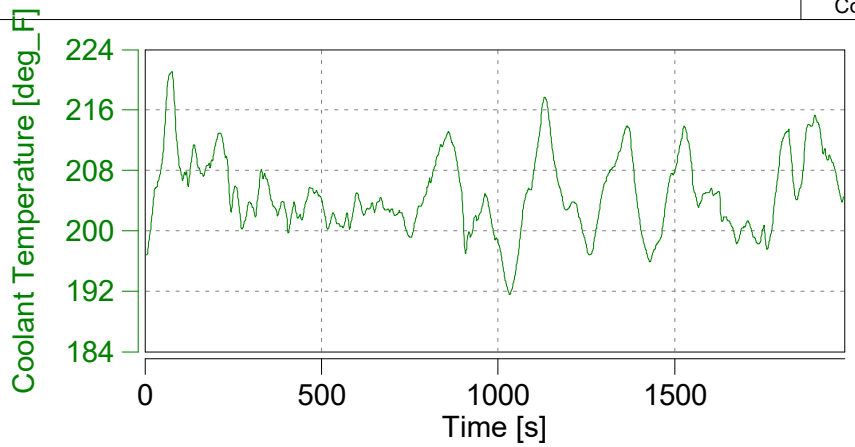
Concerto Version: 505 Build 171, Serial Number: 1604
M.O.V.E Post-Processing: DT_1R4.1_B340
Legislation:

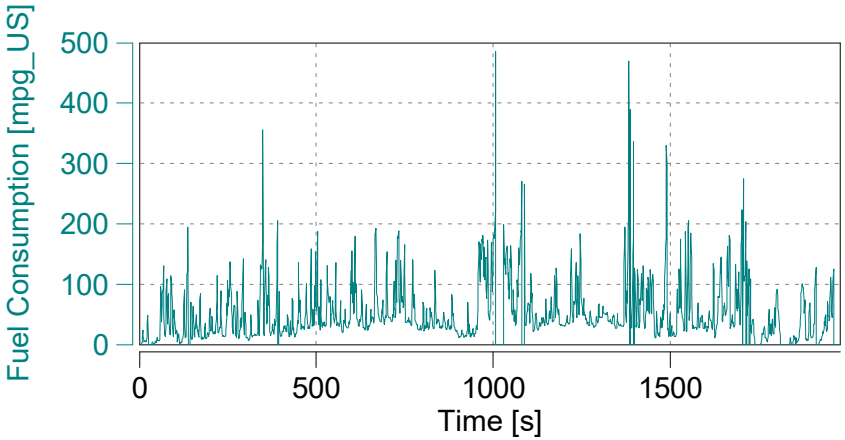
Vehicle: 213-20667 /
Engine: /
NOx Ambient Condition Corr.: 7 - CFR40 §1065.670
Dry / Wet Corr.: 2 - CFR40 §86.1342-90

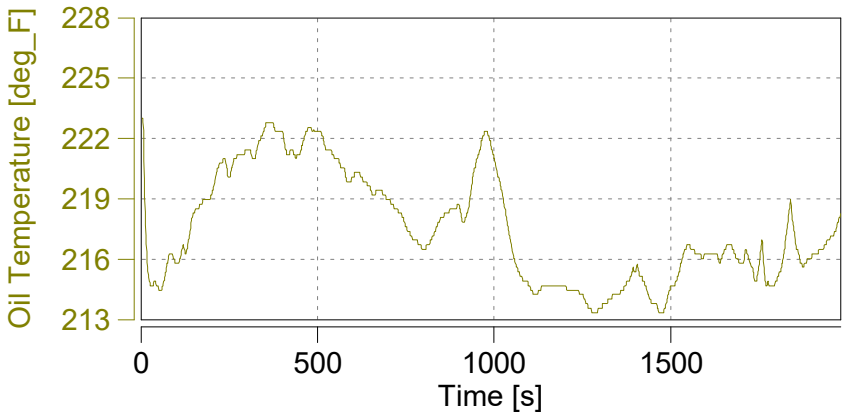
'213-20667 B2 Freeway West'
Start Date: 04/14/2022
Start Time: 10:01:13.0

AVL
Concerto M.O.V.E, 2019









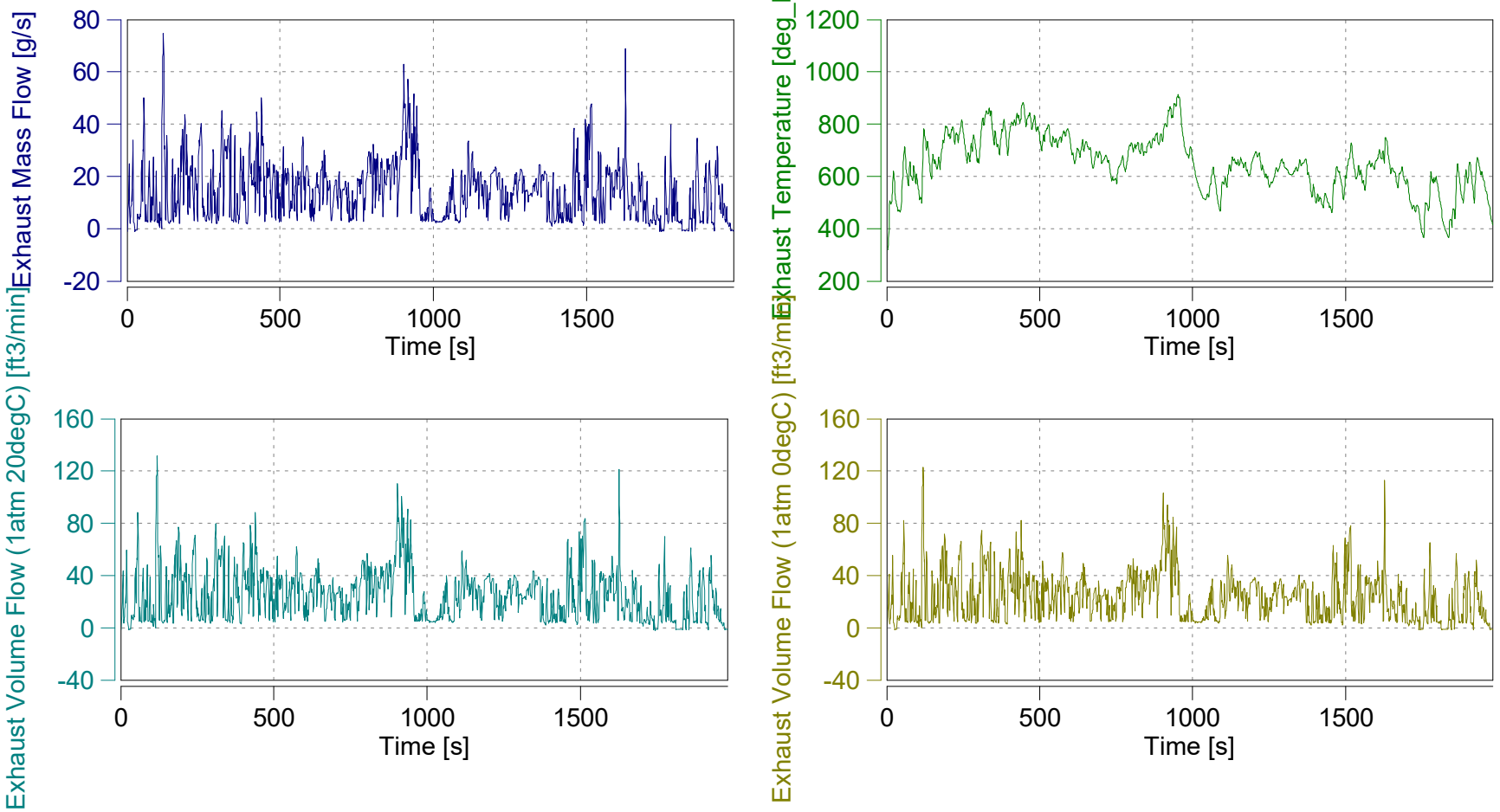
Concerto Version: 505 Build 171, Serial Number: 1604
M.O.V.E Post-Processing: DT_1R4.1_B340
Legislation:

Vehicle: 213-20667 /
Engine: /
NOx Ambient Condition Corr.: 7 - CFR40 §1065.670
Dry / Wet Corr.: 2 - CFR40 §86.1342-90

Case: 213-20667
Page: Exhaust Flow (1)

'213-20667 B2 Freeway West'
Start Date: 04/14/2022
Start Time: 10:01:13.0

AVL
Concerto M.O.V.E, 2019



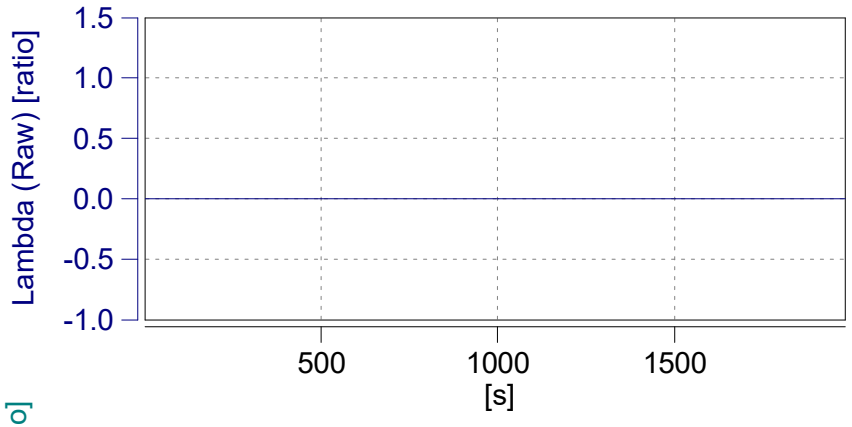
Concerto Version: 505 Build 171, Serial Number: 1604
M.O.V.E Post-Processing: DT_1R4.1_B340
Legislation:

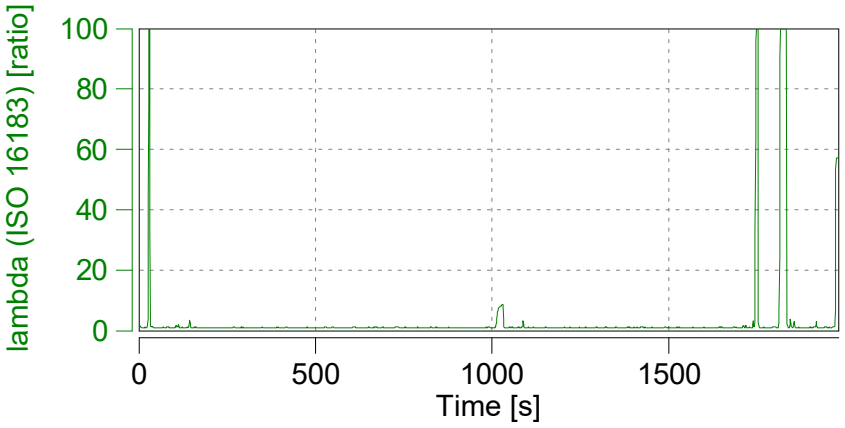
Vehicle: 213-20667 /
Engine: /
NOx Ambient Condition Corr.: 7 - CFR40 §1065.670
Dry / Wet Corr.: 2 - CFR40 §86.1342-90

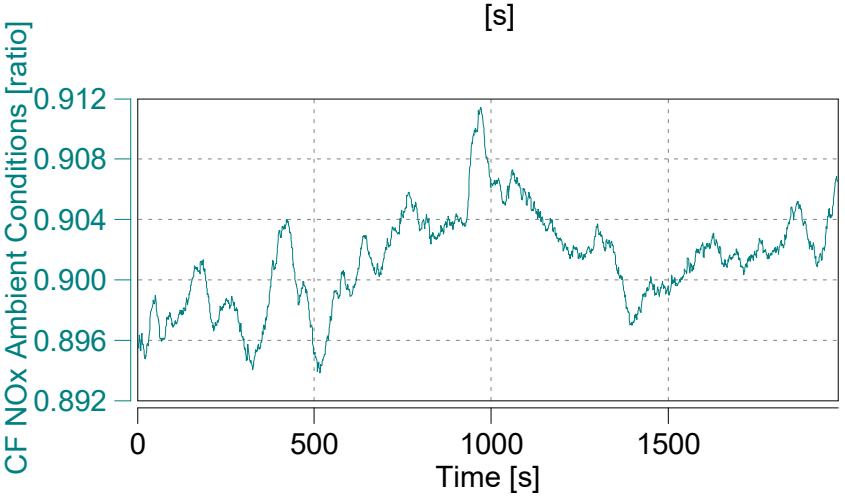
Case: 213-20667
Page: Exhaust Flow (2)

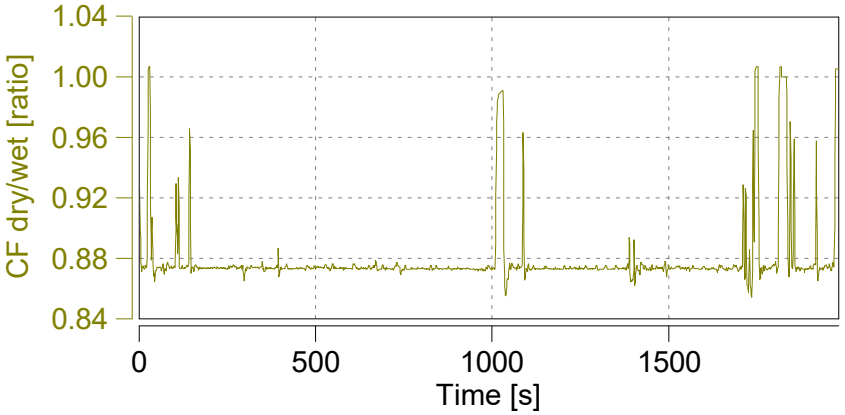
'213-20667 B2 Freeway West'
Start Date: 04/14/2022
Start Time: 10:01:13.0

AVL
Concerto M.O.V.E, 2019









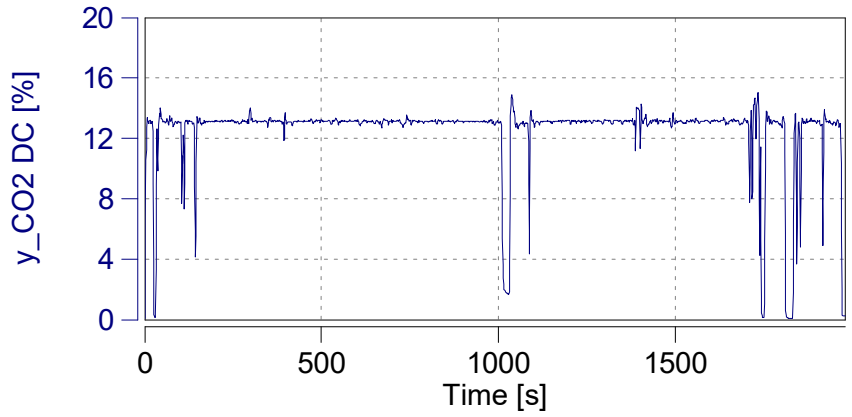
Concerto Version: 505 Build 171, Serial Number: 1604
M.O.V.E Post-Processing: DT_1R4.1_B340
Legislation:

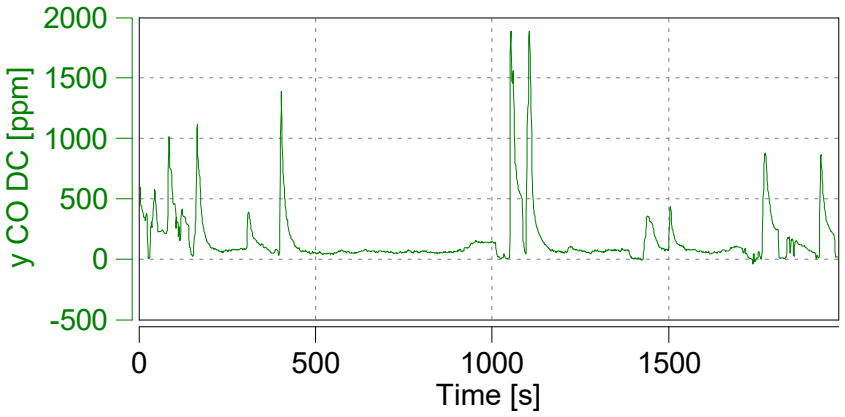
Vehicle: 213-20667 /
Engine: /
NOx Ambient Condition Corr.: 7 - CFR40 §1065.670
Dry / Wet Corr.: 2 - CFR40 §86.1342-90

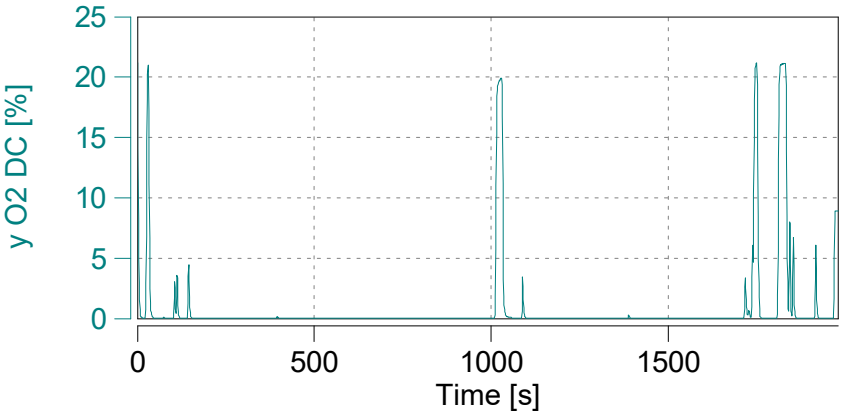
Case: 213-20667
Page: Corrected Emissions (1)

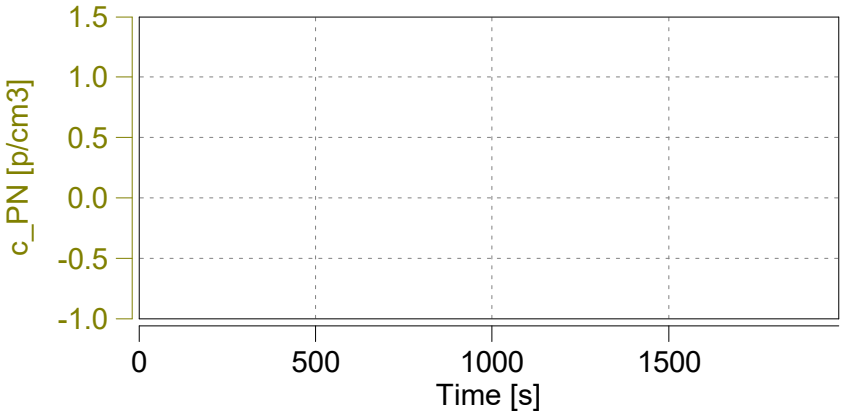
'213-20667 B2 Freeway West'
Start Date: 04/14/2022
Start Time: 10:01:13.0

AVL
Concerto M.O.V.E, 2019









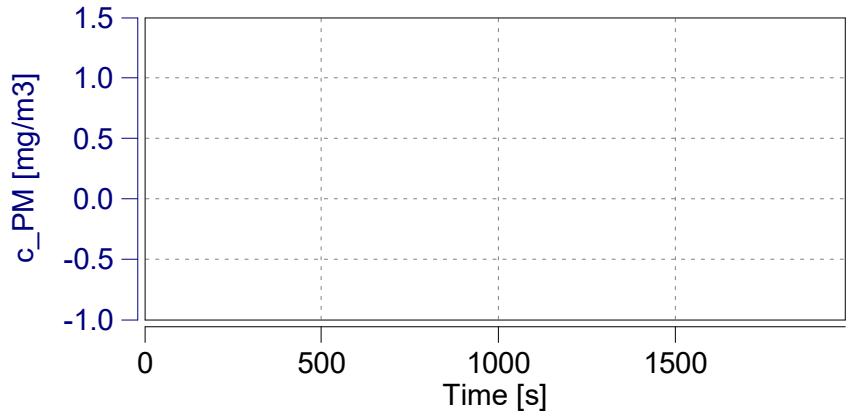
Concerto Version: 505 Build 171, Serial Number: 1604
M.O.V.E Post-Processing: DT_1R4.1_B340
Legislation:

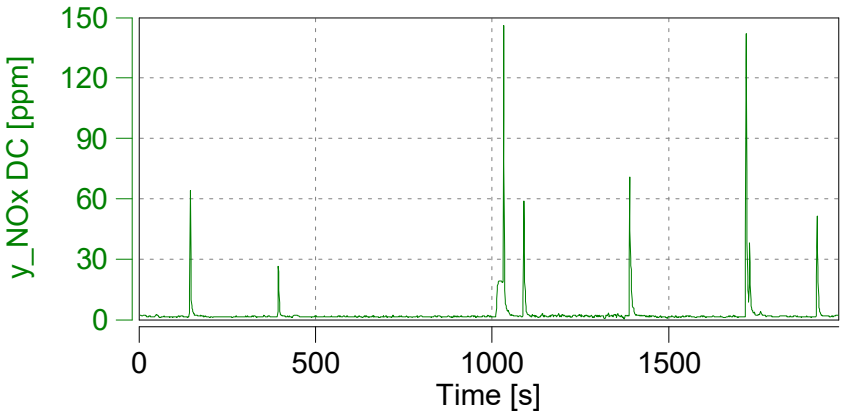
Vehicle: 213-20667 /
Engine: /
NOx Ambient Condition Corr.: 7 - CFR40 §1065.670
Dry / Wet Corr.: 2 - CFR40 §86.1342-90

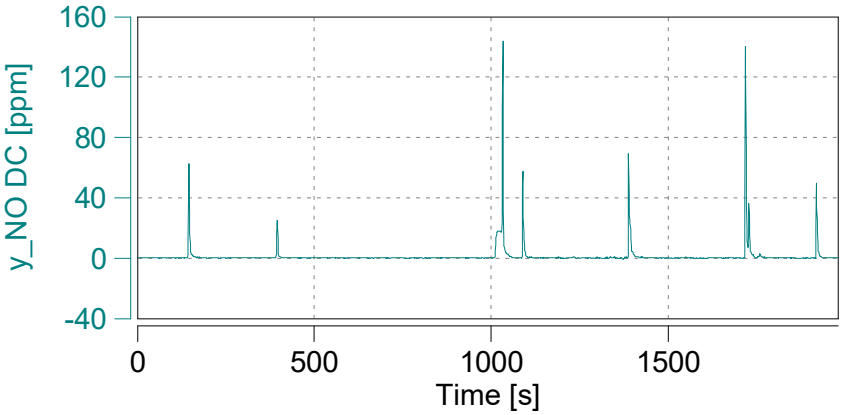
Case: 213-20667
Page: Corrected Emissions (2)

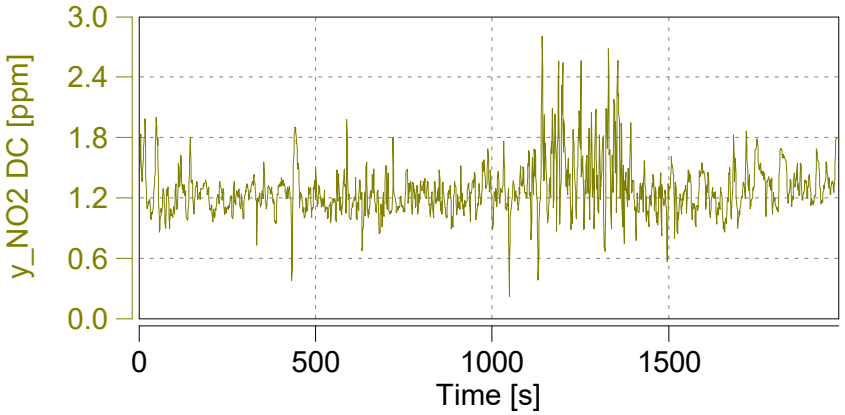
'213-20667 B2 Freeway West'
Start Date: 04/14/2022
Start Time: 10:01:13.0

AVL
Concerto M.O.V.E, 2019









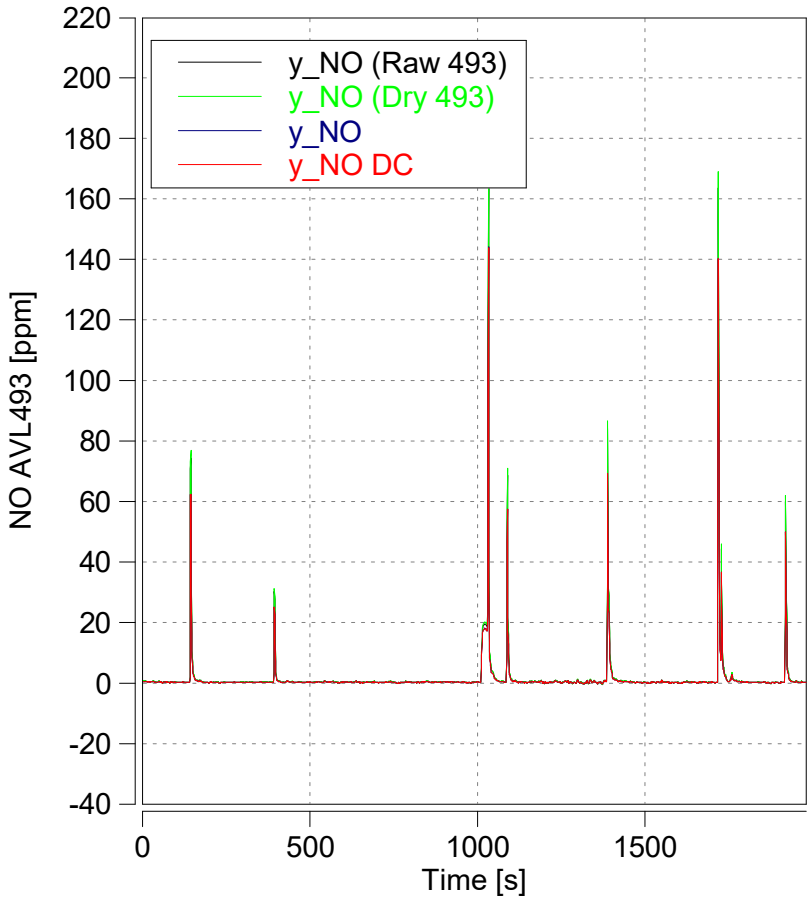
Concerto Version: 505 Build 171, Serial Number: 1604
M.O.V.E Post-Processing: DT_1R4.1_B340
Legislation:

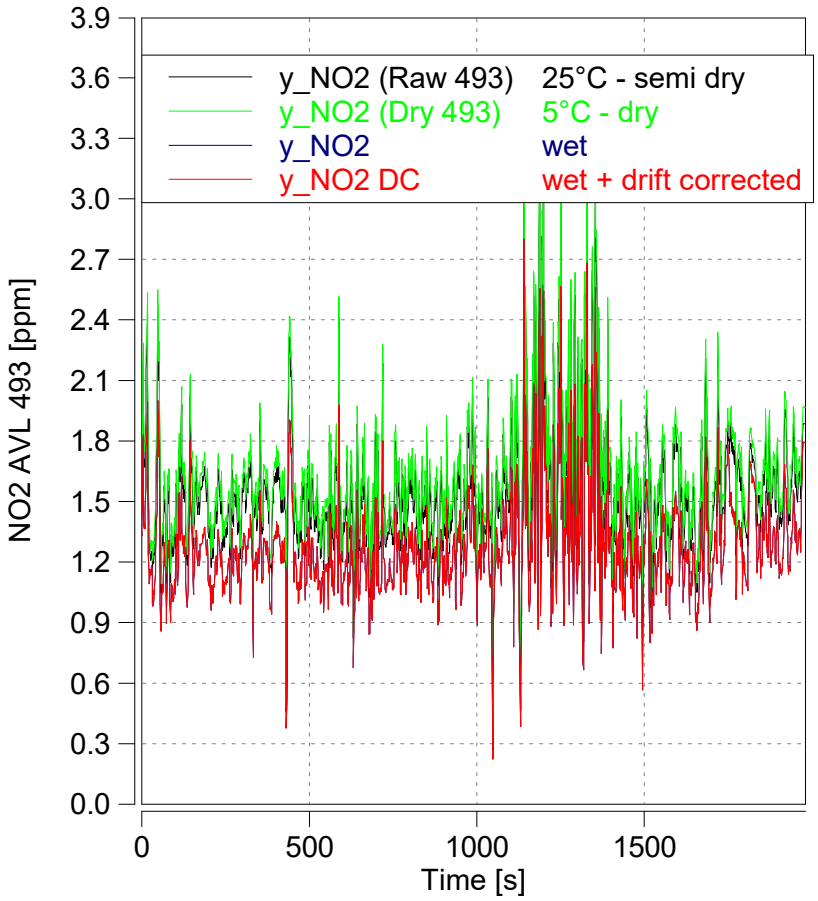
Vehicle: 213-20667 /
Engine: /
NOx Ambient Condition Corr.: 7 - CFR40 §1065.670
Dry / Wet Corr.: 2 - CFR40 §86.1342-90

Case: 213-20667
Page: Corrected Emissions (3)

'213-20667 B2 Freeway West'
Start Date: 04/14/2022
Start Time: 10:01:13.0

AVL
Concerto M.O.V.E, 2019

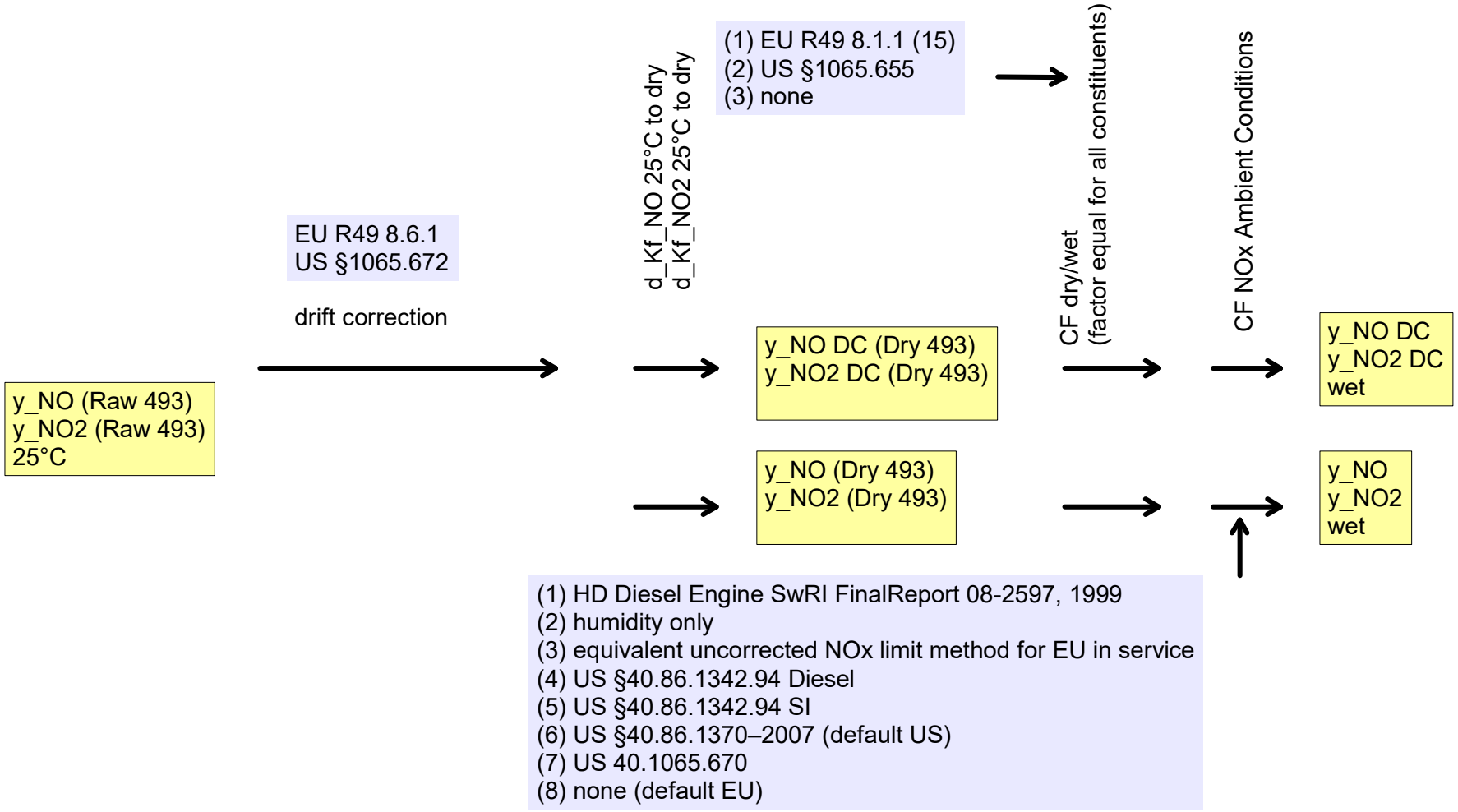




Concerto Version: 505 Build 171, Serial Number: 1604
M.O.V.E Post-Processing: DT_1R4.1_B340
Legislation:

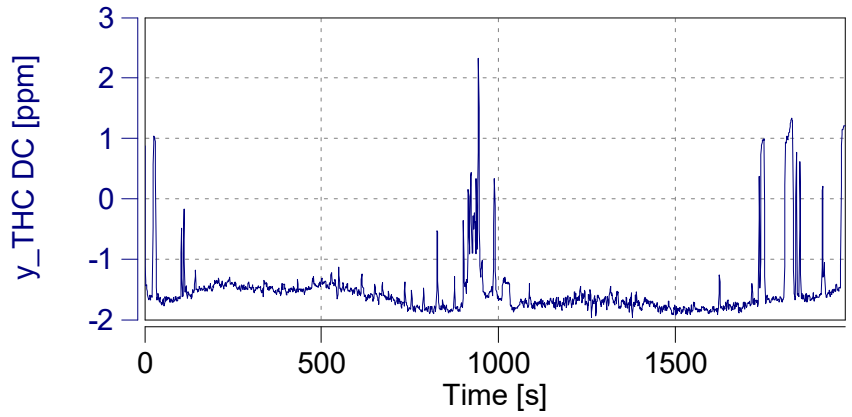
Vehicle: 213-20667 /
Engine: /
NOx Ambient Condition Corr.: 7 - CFR40 §1065.670
Dry / Wet Corr.: 2 - CFR40 §86.1342-90

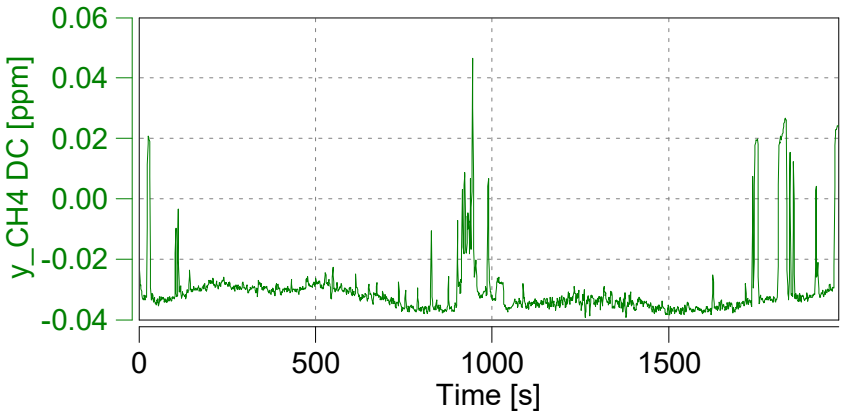
NOx - AVL 493

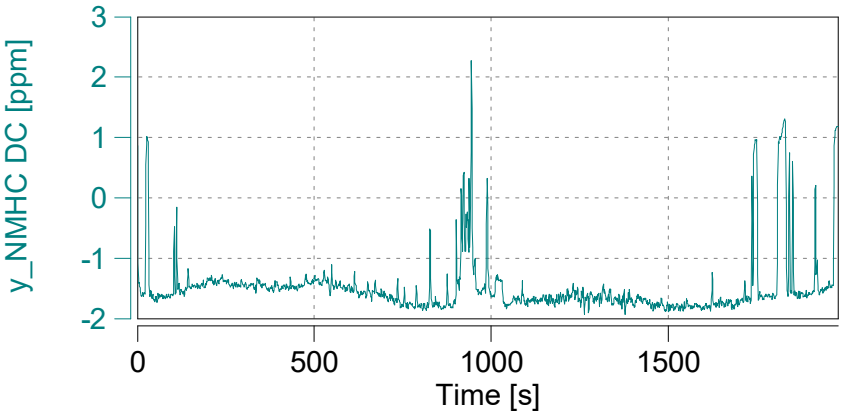

y_NO (Raw 493)
y_NO2 (Raw 493)
25°C
EU R49 8.6.1
US §1065.672
drift correction
d_Kf_NO 25°C to dry
d_Kf_NO2 25°C to dry
(1) EU R49 8.1.1 (15)
(2) US §1065.655
(3) none
y_NO DC (Dry 493)
y_NO2 DC (Dry 493)
y_NO (Dry 493)
y_NO2 (Dry 493)
CF dry/wet
(factor equal for all constituents)
CF NOx Ambient Conditions
y_NO DC
y_NO2 DC
wet
y_NO
y_NO2
wet
(1) HD Diesel Engine SwRI FinalReport 08-2597, 1999
(2) humidity only
(3) equivalent uncorrected NOx limit method for EU in service
(4) US §40.86.1342.94 Diesel
(5) US §40.86.1342.94 SI
(6) US §40.86.1370–2007 (default US)
(7) US 40.1065.670
(8) none (default EU)

'213-20667 B2 Freeway West'
Start Date: 04/14/2022
Start Time: 10:01:13.0

AVL
Concerto M.O.V.E, 2019







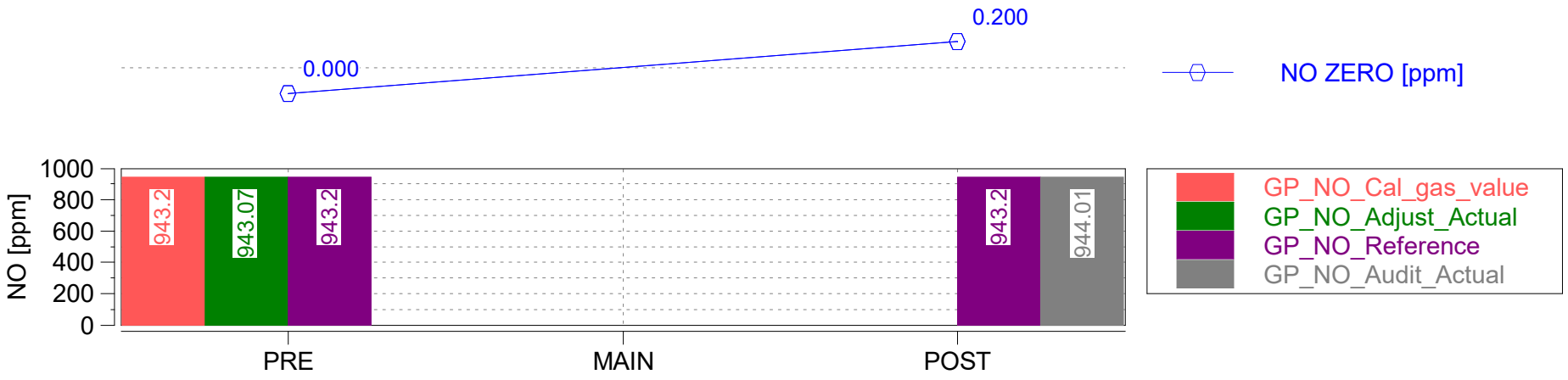
Concerto Version: 505 Build 171, Serial Number: 1604
M.O.V.E Post-Processing: DT_1R4.1_B340
Legislation:

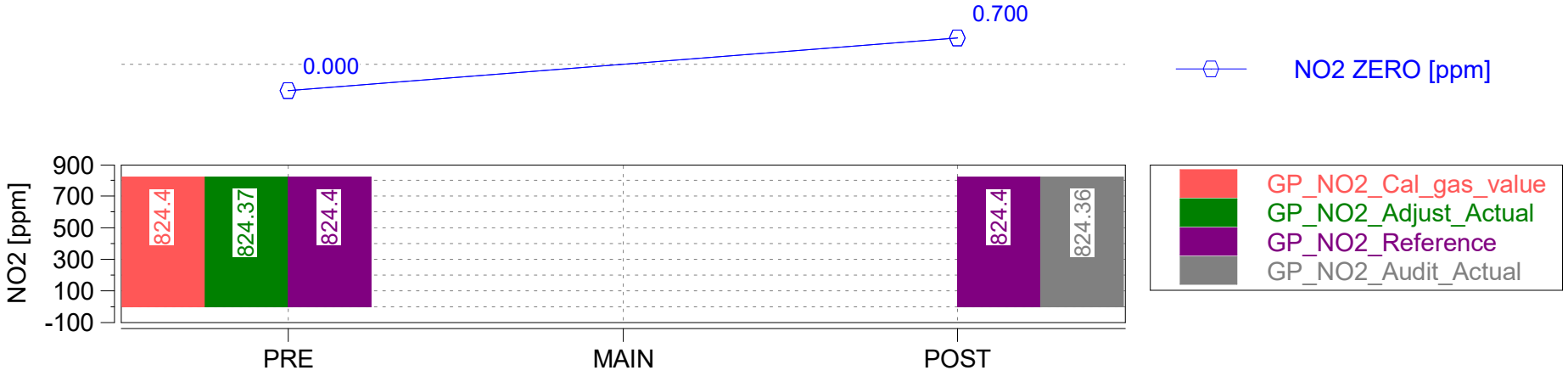
Vehicle: 213-20667 /
Engine: /
NOx Ambient Condition Corr.: 7 - CFR40 §1065.670
Dry / Wet Corr.: 2 - CFR40 §86.1342-90

Case: 213-20667
Page: NO/NO2/NOx Zero - Span

'213-20667 B2 Freeway West'
Start Date: 04/14/2022
Start Time: 10:01:13.0

AVL
Concerto M.O.V.E, 2019





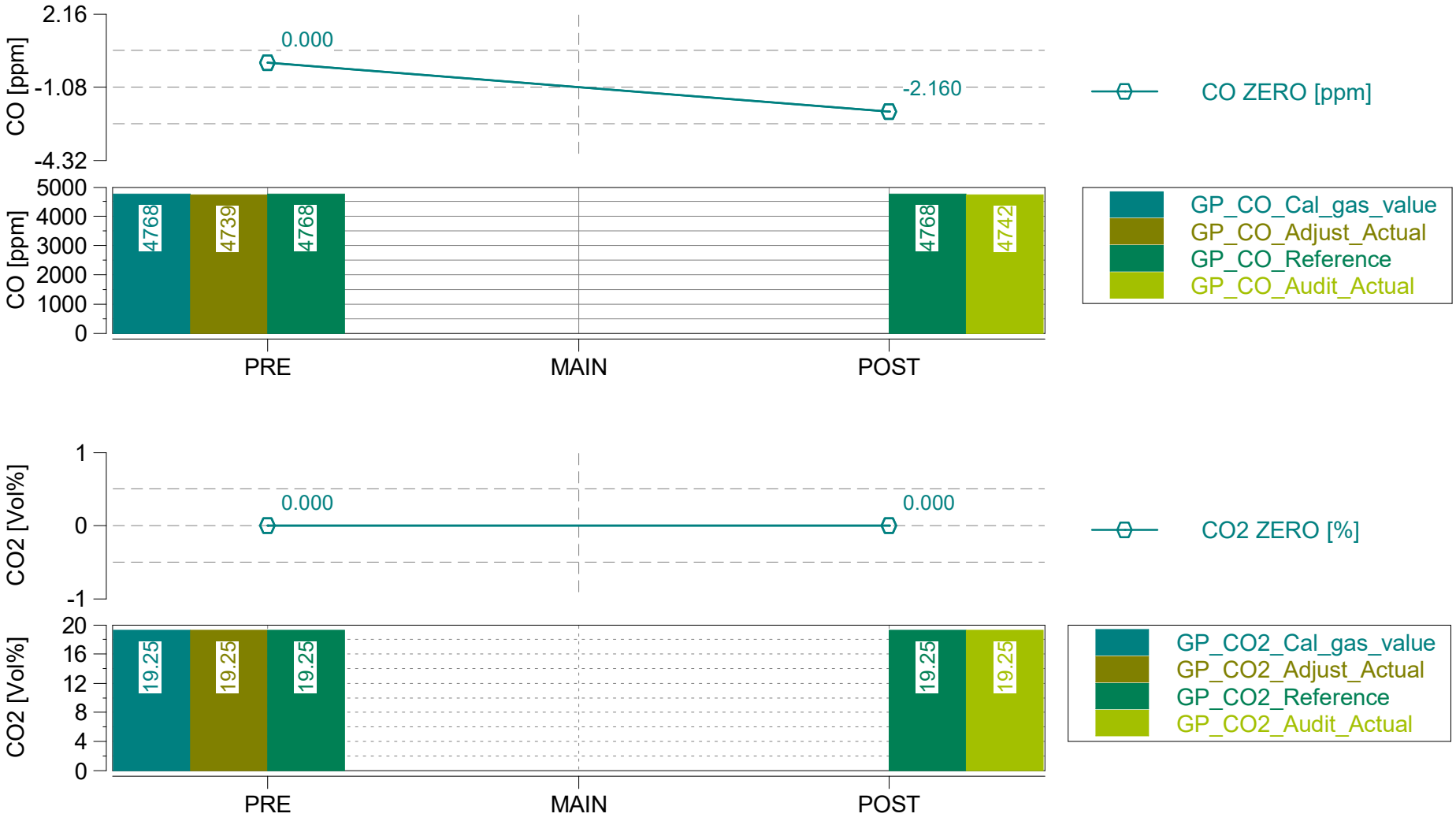
Concerto Version: 505 Build 171, Serial Number: 1604
M.O.V.E Post-Processing: DT_1R4.1_B340
Legislation:

Vehicle: 213-20667 /
Engine: /
NOx Ambient Condition Corr.: 7 - CFR40 §1065.670
Dry / Wet Corr.: 2 - CFR40 §86.1342-90

Case: 213-20667
Page: CO/CO2 Zero - Span

'213-20667 B2 Freeway West'
Start Date: 04/14/2022
Start Time: 10:01:13.0

AVL
Concerto M.O.V.E, 2019



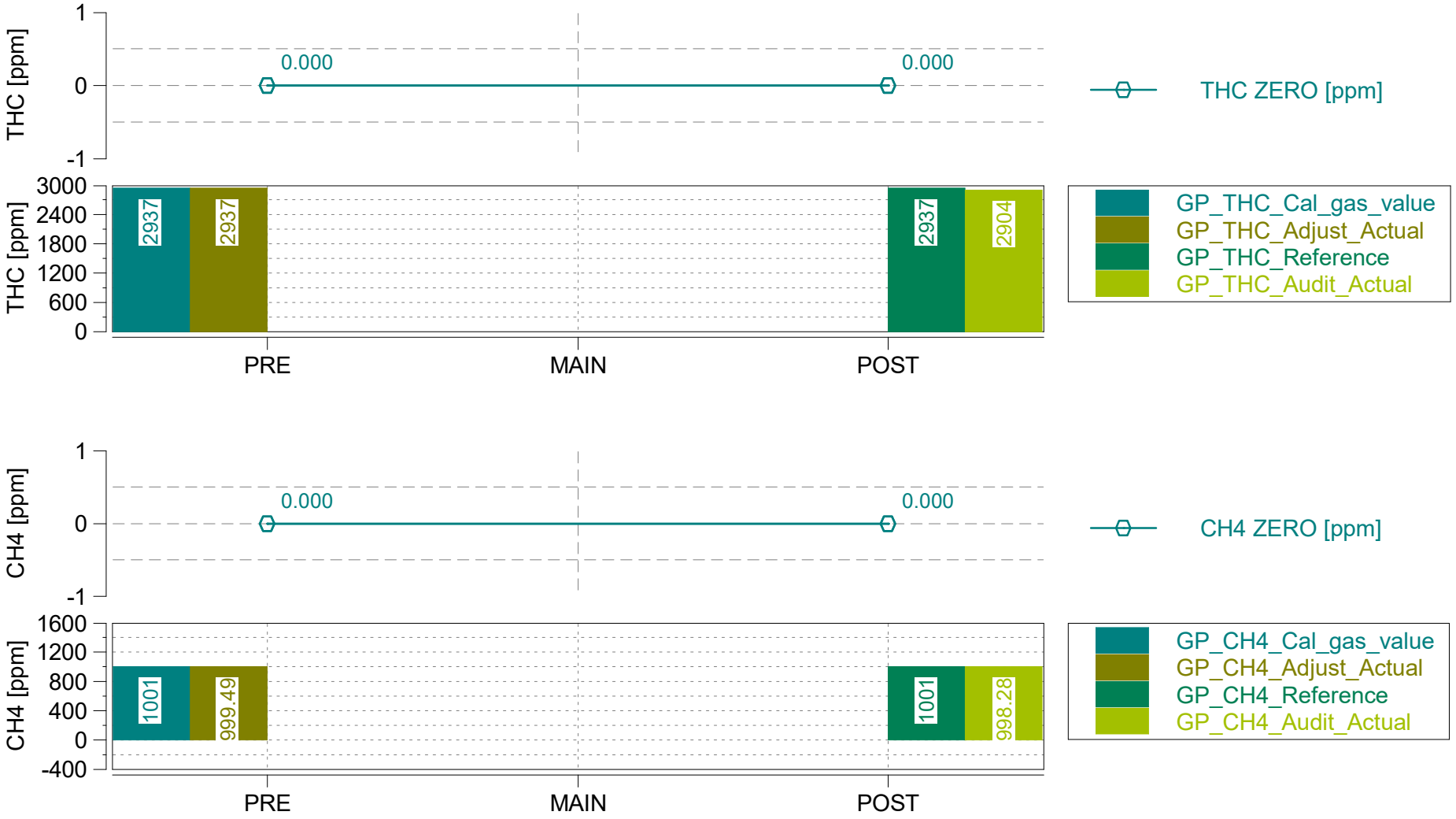
Concerto Version: 505 Build 171, Serial Number: 1604
M.O.V.E Post-Processing: DT_1R4.1_B340
Legislation:

Vehicle: 213-20667 /
Engine: /
NOx Ambient Condition Corr.: 7 - CFR40 §1065.670
Dry / Wet Corr.: 2 - CFR40 §86.1342-90

Case: 213-20667
Page: THC/CH4 Zero - Span

'213-20667 B2 Freeway West'
Start Date: 04/14/2022
Start Time: 10:01:13.0

AVL
Concerto M.O.V.E, 2019



Concerto Version: 505 Build 171, Serial Number: 1604
M.O.V.E Post-Processing: DT_1R4.1_B340
Legislation:

Vehicle: 213-20667 /
Engine: /
NOx Ambient Condition Corr.: 7 - CFR40 §1065.670
Dry / Wet Corr.: 2 - CFR40 §86.1342-90

§	criterium	condition	value	unit	pass/fail
GAS Leak Check	The leakage rate on the vacuum side shall not exceed 0.5 per cent of the in-use flow rate for the portion of the system being checked.	The leakage rate <= 0.5%	**0.00**	**%**	pass
PN Leak Check	n/a	n/a	**n/a**	**n/a**	n/a
PM Leak Check	n/a	n/a	**n/a**	**n/a**	n/a

GAS PEMS Devices

Device ID	AVL492
Serial Number	0625
Firmware Version	V1.17
Main Test Date	2022-04-14
Leak Check Age [days]	0

Device ID	AVL4925iS
Serial Number	184
Firmware Version	1.22.0.4

EFM

Device ID	AVL495
Serial Number	00826
Serial Number Tube	01080
Firmware Version	V1.16

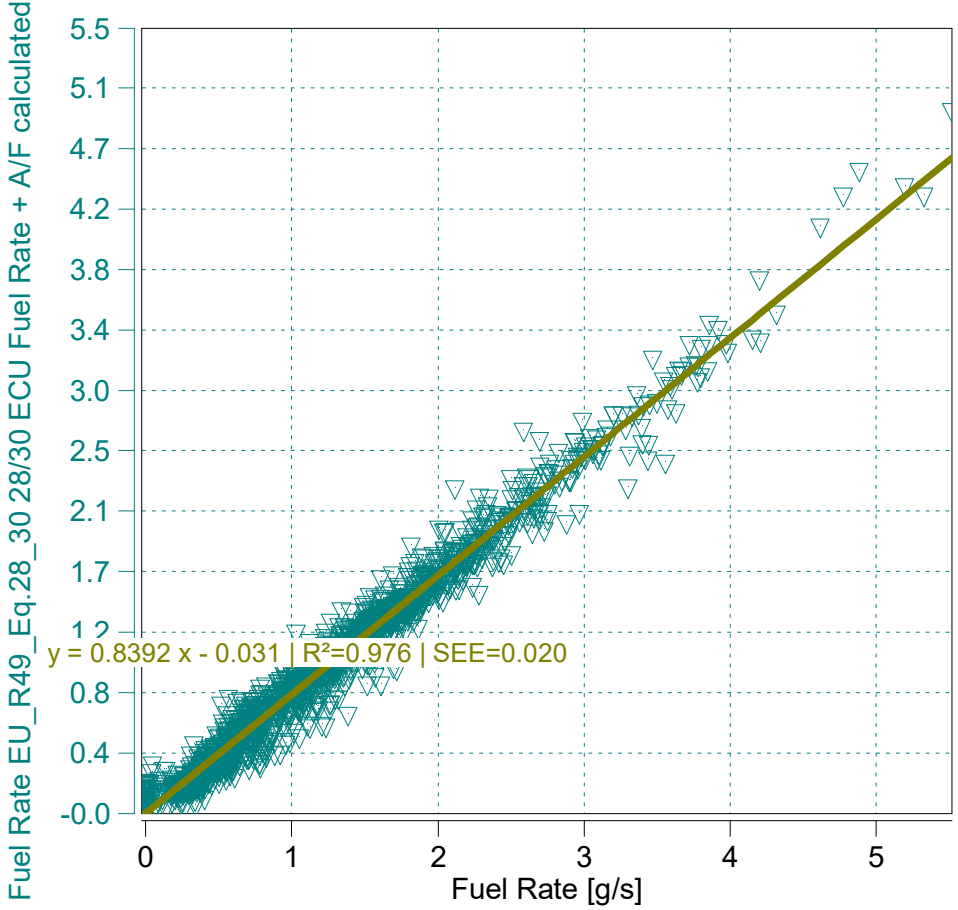
System Control

SC Version	V2.9_237
SC Serial Number	60300923

Case: 213-20667
Page: Fuel Rate ECU vs. Calculated

'213-20667 B2 Freeway West'
Start Date: 04/14/2022
Start Time: 10:01:13.0

AVL
Concerto M.O.V.E, 2019



EU 582/2011/Appendix I/3.2.1 | Fuel Rate ECU and calculated

y = 0.8392 x - 0.031 | R²=0.976 | SEE=0.020
m = 0.84 (0.9 - 1.1 recommended)
R² = 0.98 (min 0.9 mandatory)

Data from - to [% of Maximum]

0 100

Concerto Version: 505 Build 171, Serial Number: 1604
M.O.V.E Post-Processing: DT_1R4.1_B340
Legislation:

Vehicle: 213-20667 /
Engine: /
NOx Ambient Condition Corr.: 7 - CFR40 §1065.670
Dry / Wet Corr.: 2 - CFR40 §86.1342-90

Case: 213-20667
Page: Trip Summary

'213-20667 A2 Uphill'
Start Date: 04/14/2022
Start Time: 10:01:13.0

AVL
Concerto M.O.V.E, 2019

Trip Duration	2140.00	s
Trip Duration (a)	2140.00	s
Trip Distance	17.25	mi
Trip Distance (a)	17.25	mi
Trip Fuel Cons. (b)	3.10	kg
Trip Fuel Cons. (ab)	3.10	kg
Trip Fuel Cons. EU (ac)	2.45	kg
Trip Fuel Cons. US (ac)	2.45	kg
Trip Fuel Economy (b)	15.74	mpg_US
Trip Fuel Economy (ab)	15.74	mpg_US
Trip Fuel Economy EU (ac)	19.95	mpg_US
Trip Fuel Economy US (ac)	19.96	mpg_US
Trip Fuel Economy GGE (b)	15.74	mpg_US
Trip Fuel Economy GGE (ab)	15.74	mpg_US
Trip Fuel Economy EU GGE (ac)	19.95	mpg_US
Trip Fuel Economy US GGE (ac)	19.96	mpg_US
Trip Av. Eng. Speed	1306.27	rpm
Trip Av. Torque	86.42	lbft
Trip Av. Power	28.65	hp
Trip Work		
Trip Work (a)	17.03	hphr
Trip Exhaust Mass	37.13	kg
Trip Exhaust Mass EU (ac)	47.50	kg
Trip Exhaust Mass US (ac)	47.56	kg
Trip Av. Amb. Temperature	72.52	deg_F
Trip Av. Humidity	20.59	%
Trip Av. GPS Altitude	564.42	m
Fuel Type	Petrol (E10)	

ave THC	0.45476	ppm
ave NMHC	0.44566	ppm
ave CH4	0.00910	ppm
ave CO	217.70038	ppm
ave CO2	10.88504	%
ave NOx	2.72821	ppm
ave PM	n/a	mg/m3
ave Soot meas	n/a	mg/m3
ave Soot	n/a	mg/m3
ave PN	n/a	#/cm3
tot THC	0.04218	g
tot NMHC	0.03902	g
tot CH4	0.00093	g
tot CO	10.30544	g
tot CO2	7426.32063	g
tot NO (d)	0.06008	g
tot NO2	0.06720	g
tot NOx	0.12703	g
tot Soot	n/a	g
tot Soot meas	n/a	g
tot PM	n/a	g
tot PN	n/a	#
PM measurement type	0.00000	-
tot Soot on PM filter (estim.)	0.00000	mg
Soot --> PM simple scaling factor	1.00000	-
Trip Av. Veh. Speed	29.01980	mi/hr
Trip Distance Share Urban	29.61161	% distanc
Trip Distance Share Rural	70.38839	% distanc
Trip Distance Share Motorway	0.00000	% distanc

BS CO2	436.07061	g/hphr
BS CO	0.60513	g/hphr
BS THC	0.00248	g/hphr
BS NMHC	0.00229	g/hphr
BS CH4	0.00005	g/hphr
BS NO (d)	0.00353	g/hphr
BS NO2	0.00395	g/hphr
BS NOx	0.00746	g/hphr
BS Soot	n/a	g/hphr
BS Soot meas	n/a	g/hphr
BS PM	n/a	g/hphr
BS PN	n/a	#/hpr
DS CO2	430.49484	g/mi
DS CO	0.59739	g/mi
DS THC	0.00245	g/mi
DS NMHC	0.00226	g/mi
DS CH4	0.00005	g/mi
DS NO (d)	0.00348	g/mi
DS NO2	0.00390	g/mi
DS NOx	0.00736	g/mi
DS Soot	n/a	g/mi
DS Soot meas	n/a	g/mi
DS PM	n/a	g/mi
DS PN	n/a	#/mi
FS CO2	2394.48564	g/kg
FS CO	3.32281	g/kg
FS THC	0.01360	g/kg
FS NMHC	0.01258	g/kg
FS CH4	0.00030	g/kg
FS NO (d)	0.01937	g/kg
FS NO2	0.02167	g/kg
FS NOx	0.04096	g/kg
FS Soot	n/a	g/kg
FS Soot meas	n/a	g/kg
FS PM	n/a	g/kg
FS PN	n/a	#/kg

(a) GAS PEMS measurement state only, (b) based on fuel rate input (ECU, Fuel Meter), (c) Based on A/F ratio (eq 28-32 - R49)
(d) NO calculated using molecular weight of NO2, GGE=Gasoline Gallon Equivalents

Concerto Version: 505 Build 171, Serial Number: 1604
M.O.V.E Post-Processing: DT_1R4.1_B340
Legislation:

Vehicle: 213-20667 /
Engine: /
NOx Ambient Condition Corr.: 7 - CFR40 §1065.670
Dry / Wet Corr.: 2 - CFR40 §86.1342-90

Case: 213-20667
Page: Trip Summary Drift Corrected

'213-20667 A2 Uphill'
Start Date: 04/14/2022
Start Time: 10:01:13.0

AVL
Concerto M.O.V.E, 2019

Trip Duration	2140.00	s
Trip Duration (a)	2140.00	s
Trip Distance	17.25	mi
Trip Distance (a)	17.25	mi
Trip Fuel Cons. (b)	3.10	kg
Trip Fuel Cons. (ab)	3.10	kg
Trip Fuel Cons. EU (ac)	2.45	kg
Trip Fuel Cons. US (ac)	2.45	kg
Trip Fuel Economy (b)	15.74	mpg_US
Trip Fuel Economy (ab)	15.74	mpg_US
Trip Fuel Economy EU (ac)	19.95	mpg_US
Trip Fuel Economy US (ac)	19.96	mpg_US
Trip Fuel Economy GGE (b)	15.74	mpg_US
Trip Fuel Economy GGE (ab)	15.74	mpg_US
Trip Fuel Economy EU GGE (ac)	19.95	mpg_US
Trip Fuel Economy US GGE (ac)	19.96	mpg_US
Trip Av. Eng. Speed	1306.27	rpm
Trip Av. Torque	86.42	lbft
Trip Av. Power	28.65	hp
Trip Work		
Trip Work (a)	17.03	hphr
Trip Exhaust Mass	37.13	kg
Trip Exhaust Mass EU (ac)	47.50	kg
Trip Exhaust Mass US (ac)	47.56	kg
Trip Av. Amb. Temperature	72.52	deg_F
Trip Av. Humidity	20.59	%
Trip Av. GPS Altitude	564.42	m
Fuel Type	Petrol (E10)	

ave THC DC	0.45736	ppm
ave NMHC DC	0.44822	ppm
ave CH4 DC	0.00915	ppm
ave CO DC	218.94226	ppm
ave CO2 DC	10.88504	%
ave NOx DC	2.72767	ppm
ave PM	n/a	mg/m3
ave Soot meas	n/a	mg/m3
ave Soot	n/a	mg/m3
ave PN DC		
tot THC DC	0.04243	g
tot NMHC DC	0.03924	g
tot CH4 DC	0.00094	g
tot CO DC	10.36423	g
tot CO2 DC	7426.32063	g
tot NO DC (d)	0.06006	g
tot NO2 DC	0.06720	g
tot NOx DC	0.12701	g
tot Soot	n/a	g
tot Soot meas	n/a	g
tot PM	n/a	g
tot PN DC		
PM measurement type	0.00000	-
tot Soot on PM filter (estim.)	0.00000	mg
Soot --> PM simple scaling factor	1.00000	-
Trip Av. Veh. Speed	29.01980	mi/hr
Trip Distance Share Urban	29.61161	% distanc
Trip Distance Share Rural	70.38839	% distanc
Trip Distance Share Motorway	0.00000	% distanc

BS CO2 DC	436.07061	g/hphr
BS CO DC	0.60858	g/hphr
BS THC DC	0.00249	g/hphr
BS NMHC DC	0.00230	g/hphr
BS CH4 DC	0.00006	g/hphr
BS NO DC (d)	0.00353	g/hphr
BS NO2 DC	0.00395	g/hphr
BS NOx DC	0.00746	g/hphr
BS Soot	n/a	g/hphr
BS Soot meas	n/a	g/hphr
BS PM	n/a	g/hphr
BS PN DC		
DS CO2 DC	430.49484	g/mi
DS CO DC	0.60080	g/mi
DS THC DC	0.00246	g/mi
DS NMHC DC	0.00227	g/mi
DS CH4 DC	0.00005	g/mi
DS NO DC (d)	0.00348	g/mi
DS NO2 DC	0.00390	g/mi
DS NOx DC	0.00736	g/mi
DS Soot	n/a	g/mi
DS Soot meas	n/a	g/mi
DS PM	n/a	g/mi
DS PN DC		
FS CO2 DC	2394.48564	g/kg
FS CO DC	3.34176	g/kg
FS THC DC	0.01368	g/kg
FS NMHC DC	0.01265	g/kg
FS CH4 DC	0.00030	g/kg
FS NO DC (d)	0.01936	g/kg
FS NO2 DC	0.02167	g/kg
FS NOx DC	0.04095	g/kg
FS Soot	n/a	g/kg
FS Soot meas	n/a	g/kg
FS PM	n/a	g/kg
FS PN DC		

(a) GAS PEMS measurement state only, (b) based on fuel rate input (ECU, Fuel Meter), (c) Based on A/F ratio (eq 28-32 - R49)
(d) NO calculated using molecular weight of NO2, GGE=Gasoline Gallon Equivalents

Concerto Version: 505 Build 171, Serial Number: 1604
M.O.V.E Post-Processing: DT_1R4.1_B340
Legislation:

Vehicle: 213-20667 /
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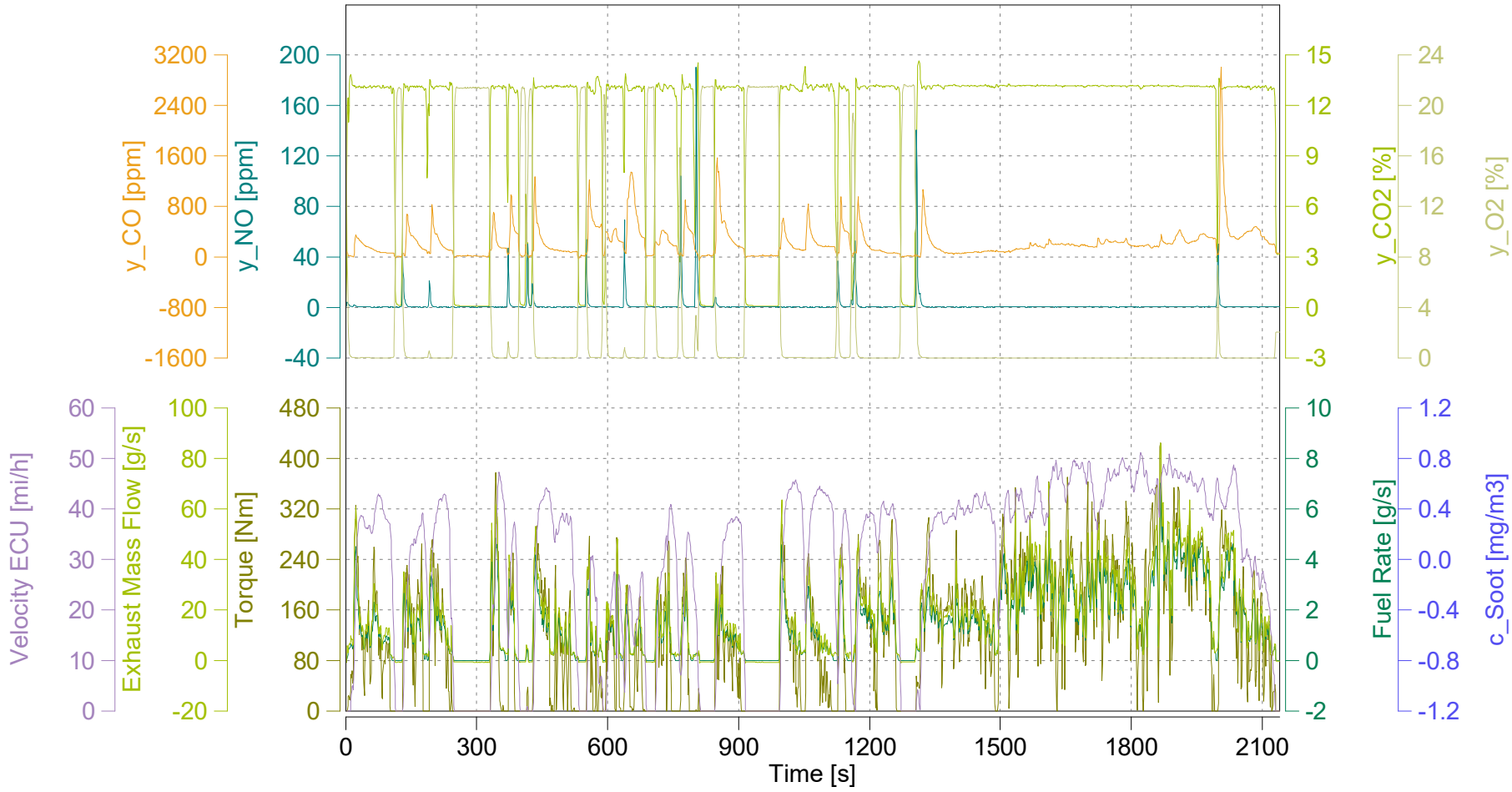
NOx Ambient Condition Corr.: 7 - CFR40 §1065.670
Dry / Wet Corr.: 2 - CFR40 §86.1342-90

Case: 213-20667
Page: Time Alignment Check

'213-20667 A2 Uphill'
Start Date: 04/14/2022
Start Time: 10:01:13.0

AVL

Concerto M.



Absolute Tim

y_THC
y_NO
y_CO2
y_O2
c_Soot
Fuel Rate
Exhaust Mas
Torque
Velocity ECU

AVL 492 De

THC
NO/NO2
CO/CO2
O2

Apply De

Alignment F

Reset Time

Reset A

Apply Cu

Concerto Version: 505 Build 171, Serial Number: 1604
M.O.V.E Post-Processing: DT_1R4.1_B340
Legislation:

Vehicle: 213-20667 /
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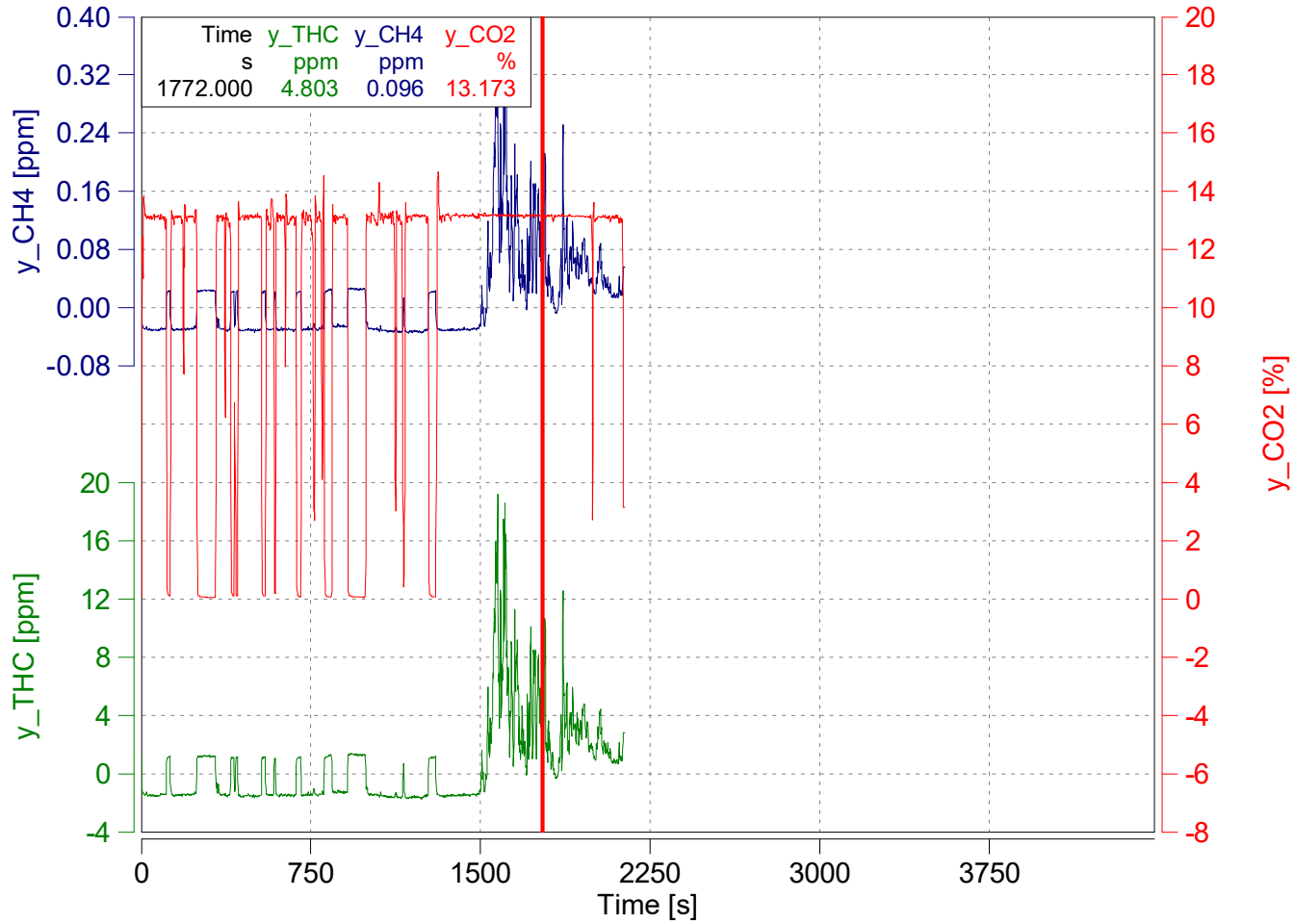
NOx Ambient Condition Corr.: 7 - CFR40 §1065.670
Dry / Wet Corr.: 2 - CFR40 §86.1342-90

Case: 213-20667
Page: Time Alignment of Gas Concentrations

'213-20667 A2 Uphill'
Start Date: 04/14/2022
Start Time: 10:01:13.0

AVL
Concerto M.O.V.E, 2019



Absolute Time Shifts

y_THC	s	-4.3
y_CH4	s	-6.3

Reset Time Shifts in Plot

Apply Current Values

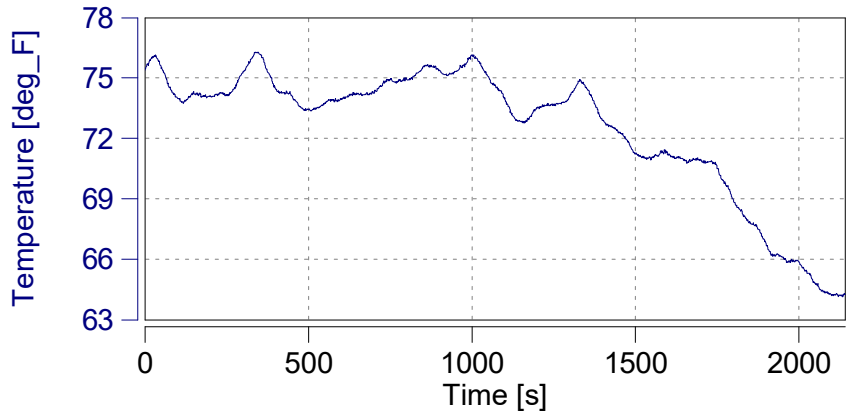
Concerto Version: 505 Build 171, Serial Number: 1604
M.O.V.E Post-Processing: DT_1R4.1_B340
Legislation:

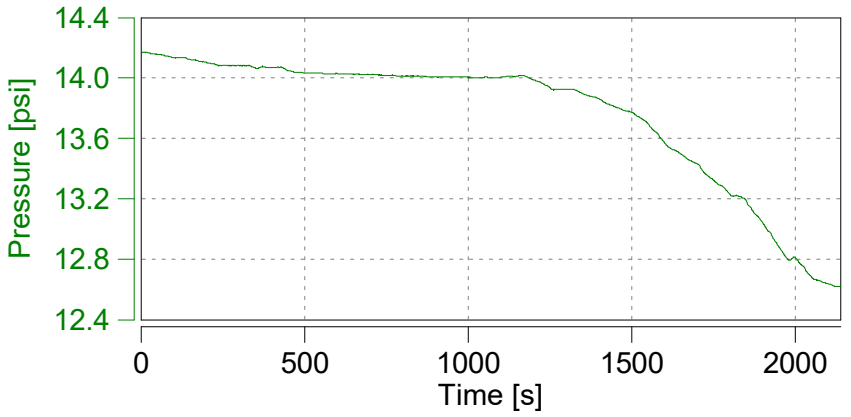
Vehicle: 213-20667 /
Engine: /
NOx Ambient Condition Corr.: 7 - CFR40 §1065.670
Dry / Wet Corr.: 2 - CFR40 §86.1342-90

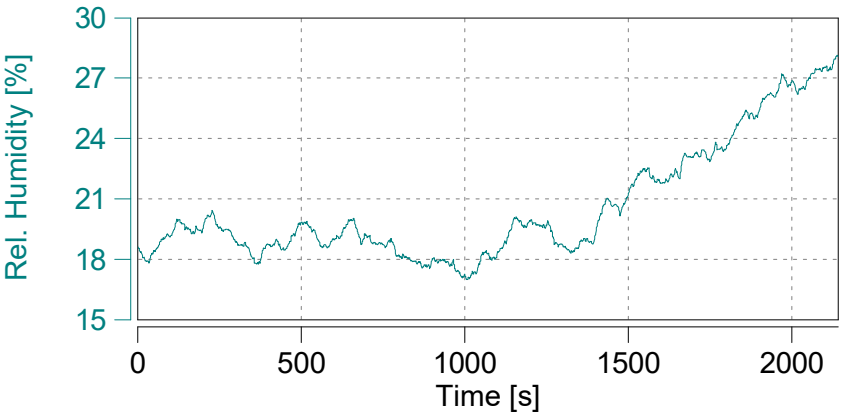
Case: 213-20667
Page: Ambient Conditions

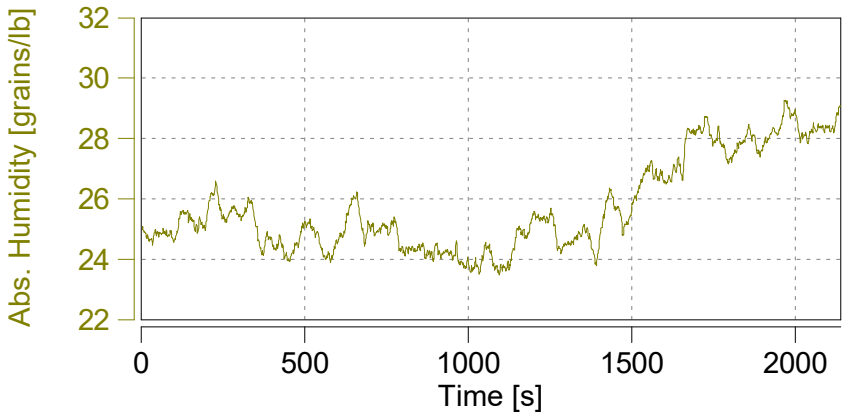
'213-20667 A2 Uphill'
Start Date: 04/14/2022
Start Time: 10:01:13.0

AVL
Concerto M.O.V.E, 2019









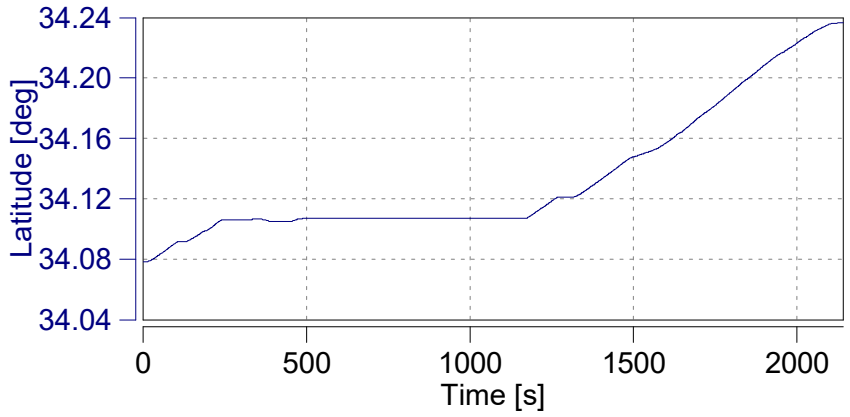
Concerto Version: 505 Build 171, Serial Number: 1604
M.O.V.E Post-Processing: DT_1R4.1_B340
Legislation:

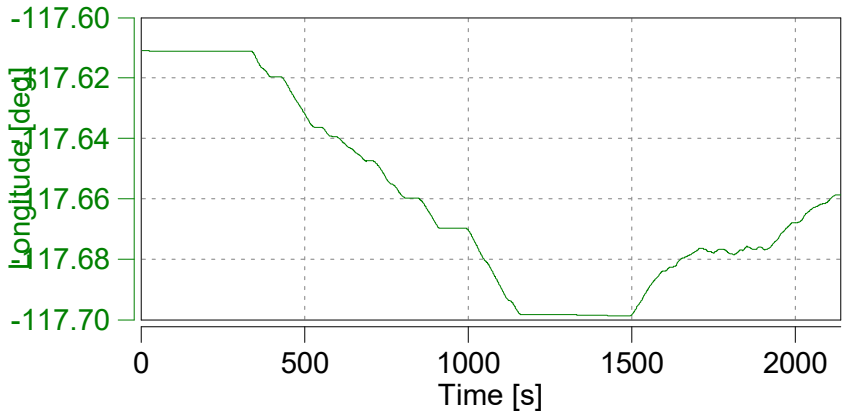
Vehicle: 213-20667 /
Engine: /
NOx Ambient Condition Corr.: 7 - CFR40 §1065.670
Dry / Wet Corr.: 2 - CFR40 §86.1342-90

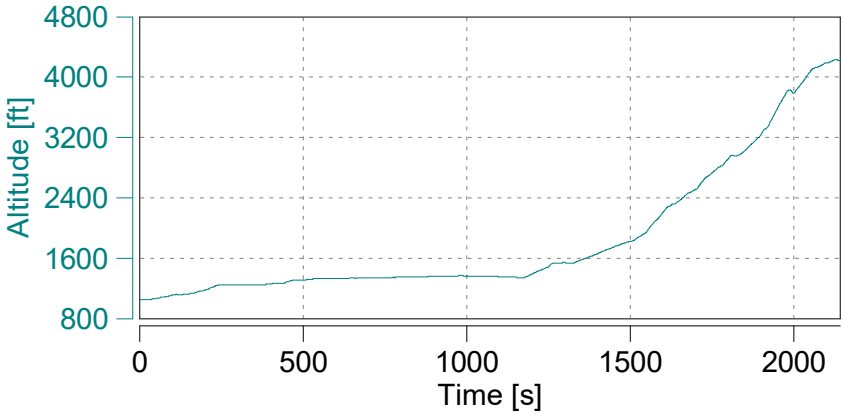
Case: 213-20667
Page: GPS

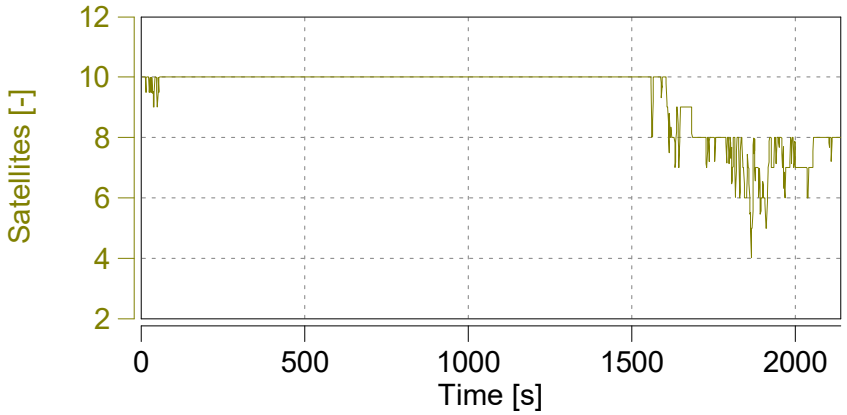
'213-20667 A2 Uphill'
Start Date: 04/14/2022
Start Time: 10:01:13.0

AVL
Concerto M.O.V.E, 2019









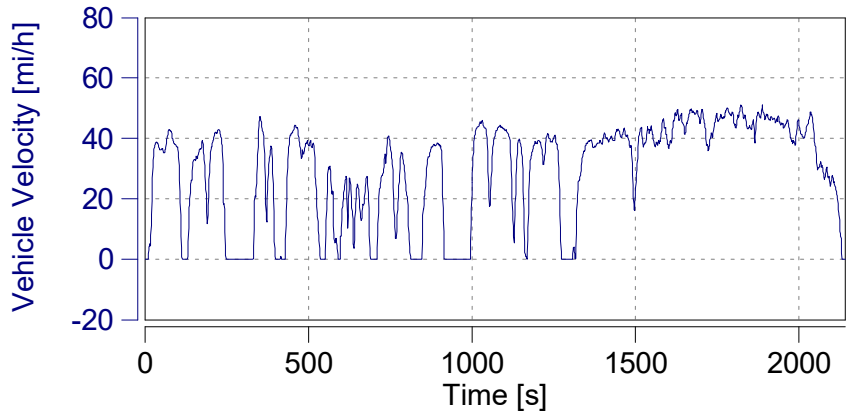
Concerto Version: 505 Build 171, Serial Number: 1604
M.O.V.E Post-Processing: DT_1R4.1_B340
Legislation:

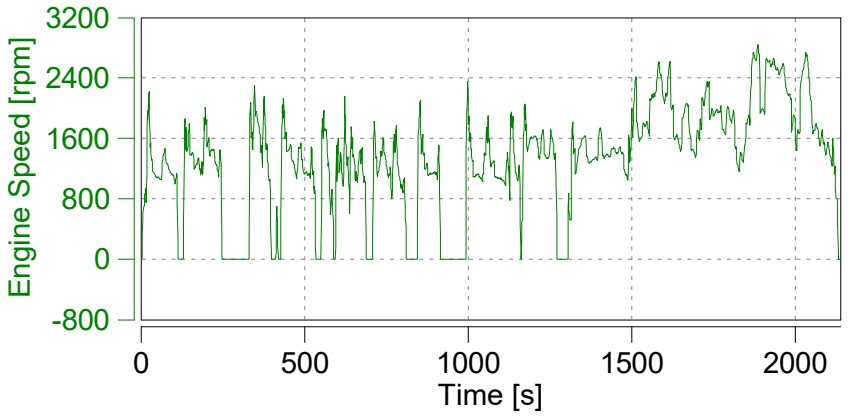
Vehicle: 213-20667 /
Engine: /
NOx Ambient Condition Corr.: 7 - CFR40 §1065.670
Dry / Wet Corr.: 2 - CFR40 §86.1342-90

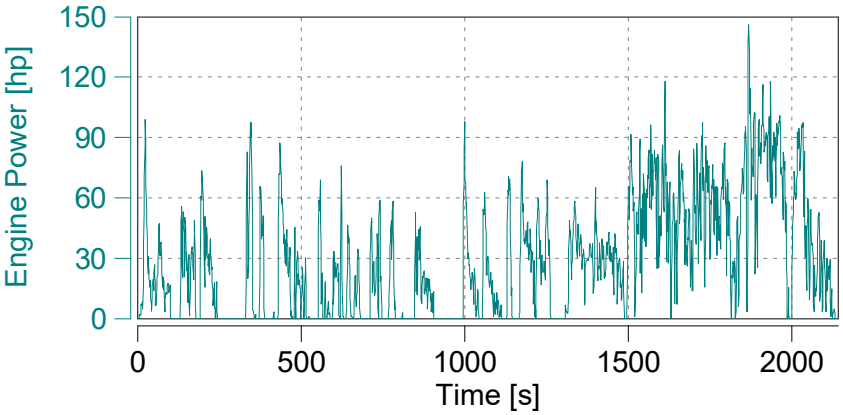
Case: 213-20667
Page: Engine (1)

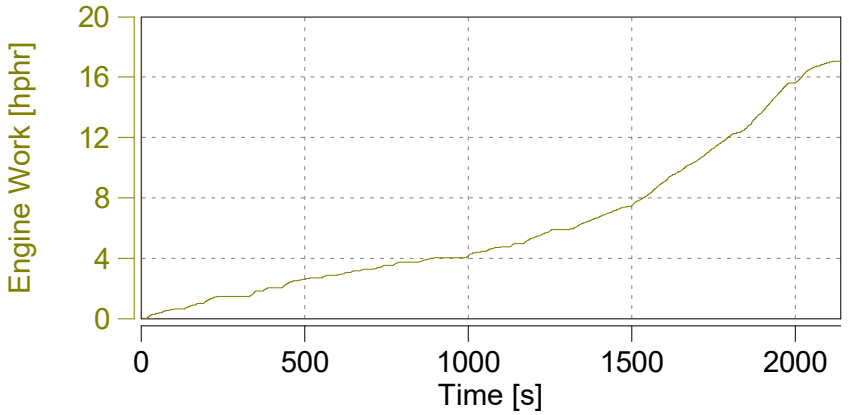
'213-20667 A2 Uphill'
Start Date: 04/14/2022
Start Time: 10:01:13.0

AVL
Concerto M.O.V.E, 2019









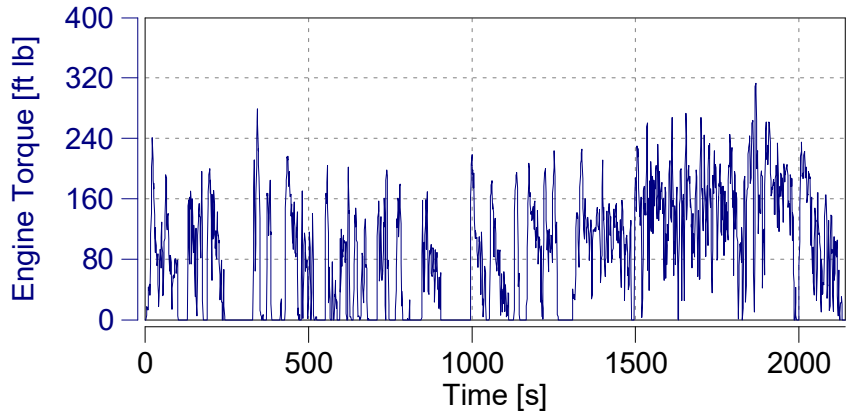
Concerto Version: 505 Build 171, Serial Number: 1604
M.O.V.E Post-Processing: DT_1R4.1_B340
Legislation:

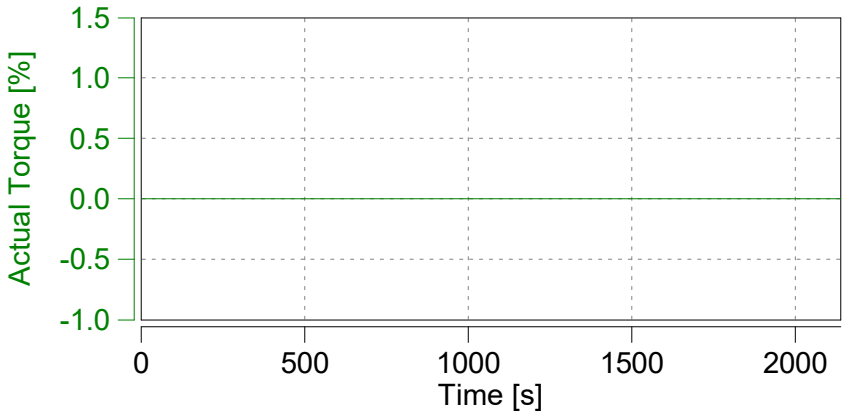
Vehicle: 213-20667 /
Engine: /
NOx Ambient Condition Corr.: 7 - CFR40 §1065.670
Dry / Wet Corr.: 2 - CFR40 §86.1342-90

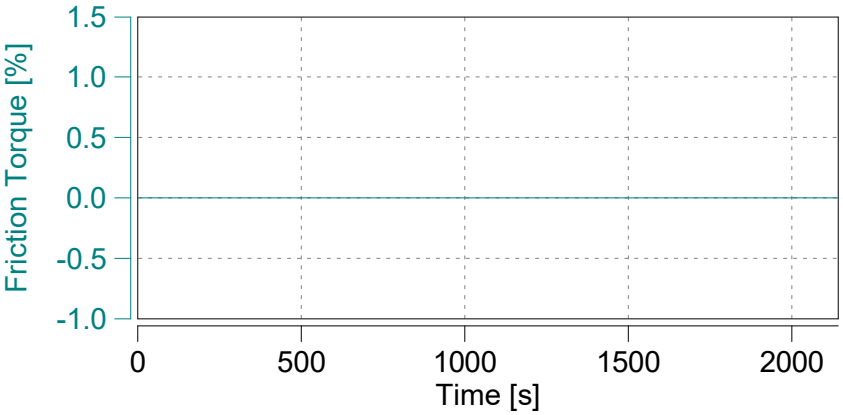
Case: 213-20667
Page: Engine (2)

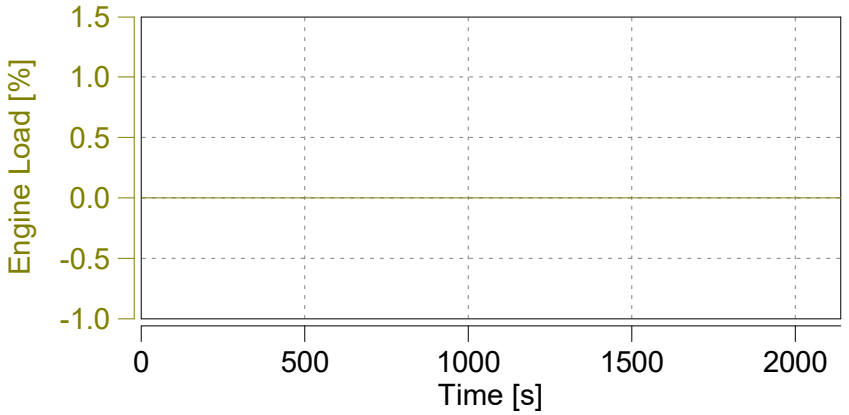
'213-20667 A2 Uphill'
Start Date: 04/14/2022
Start Time: 10:01:13.0

AVL
Concerto M.O.V.E, 2019







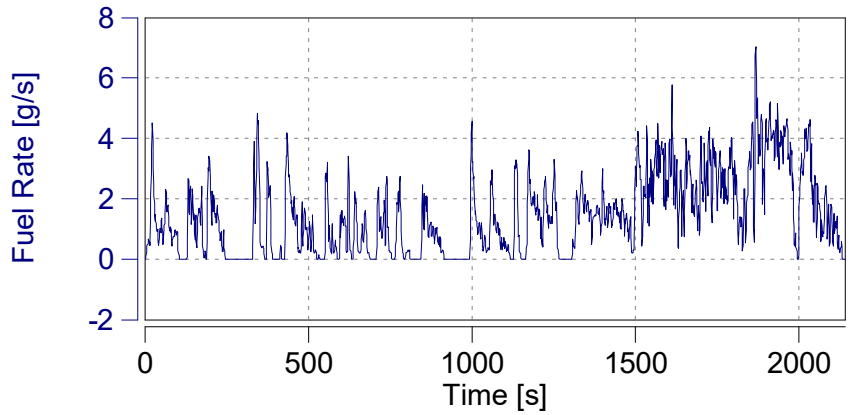


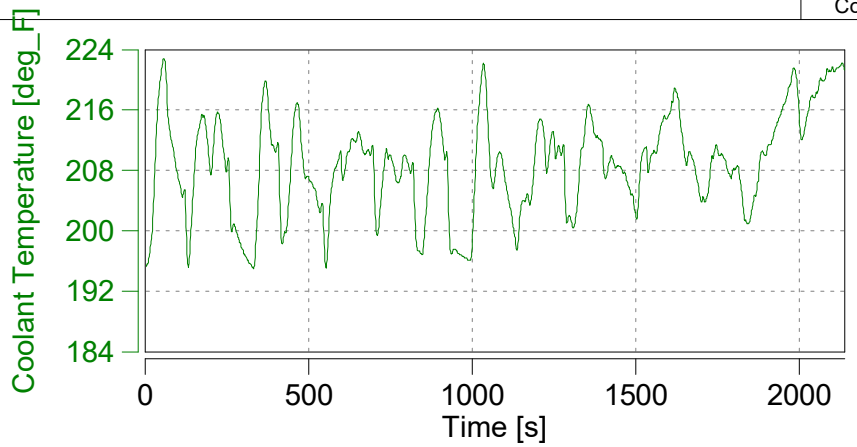
Concerto Version: 505 Build 171, Serial Number: 1604
M.O.V.E Post-Processing: DT_1R4.1_B340
Legislation:

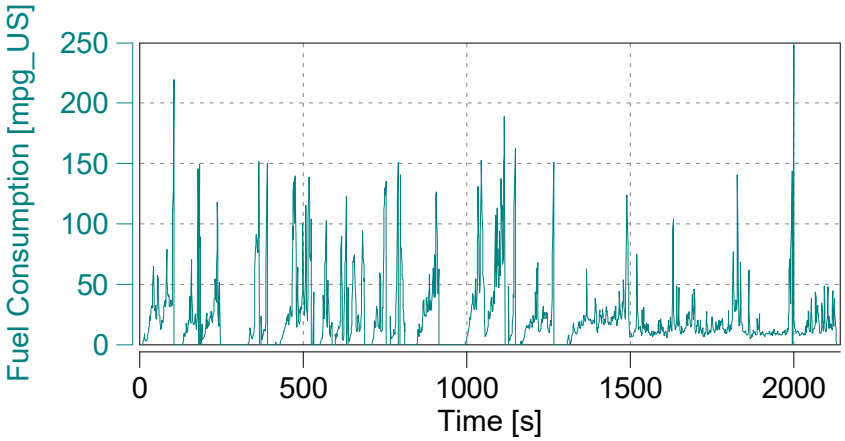
Vehicle: 213-20667 /
Engine: /
NOx Ambient Condition Corr.: 7 - CFR40 §1065.670
Dry / Wet Corr.: 2 - CFR40 §86.1342-90

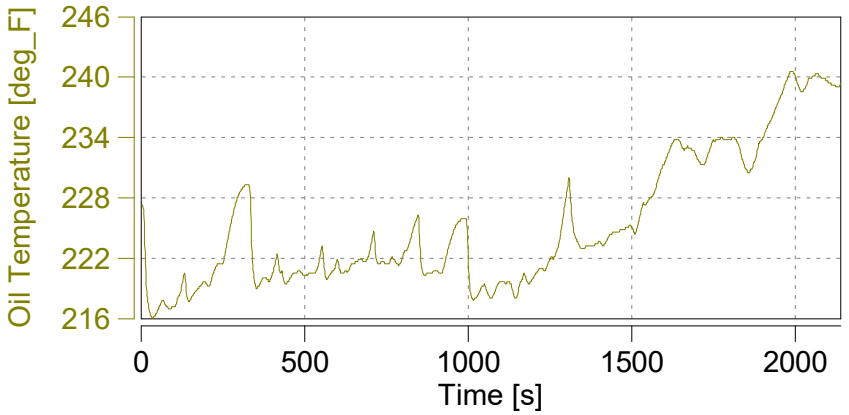
'213-20667 A2 Uphill'
Start Date: 04/14/2022
Start Time: 10:01:13.0

AVL
Concerto M.O.V.E, 2019









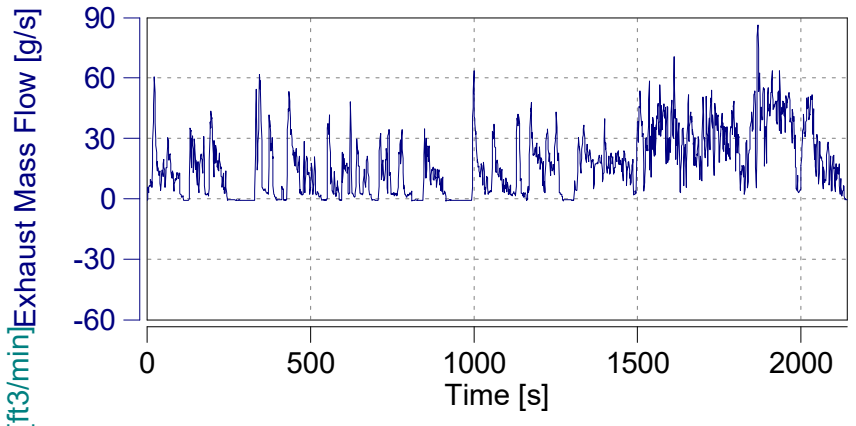
Concerto Version: 505 Build 171, Serial Number: 1604
M.O.V.E Post-Processing: DT_1R4.1_B340
Legislation:

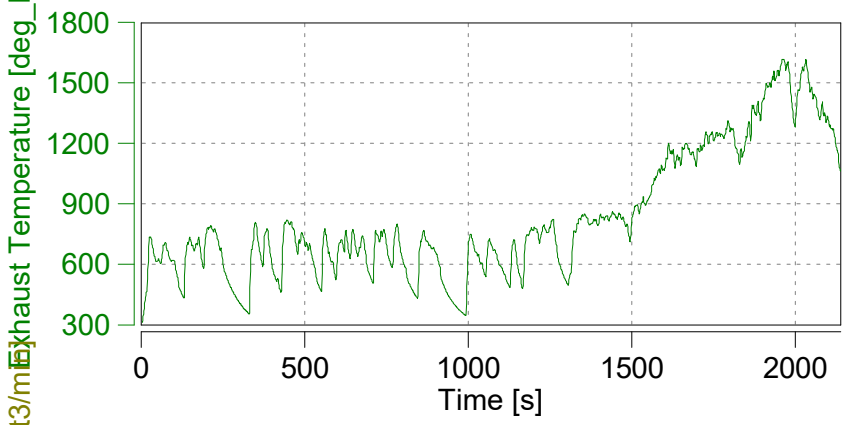
Vehicle: 213-20667 /
Engine: /
NOx Ambient Condition Corr.: 7 - CFR40 §1065.670
Dry / Wet Corr.: 2 - CFR40 §86.1342-90

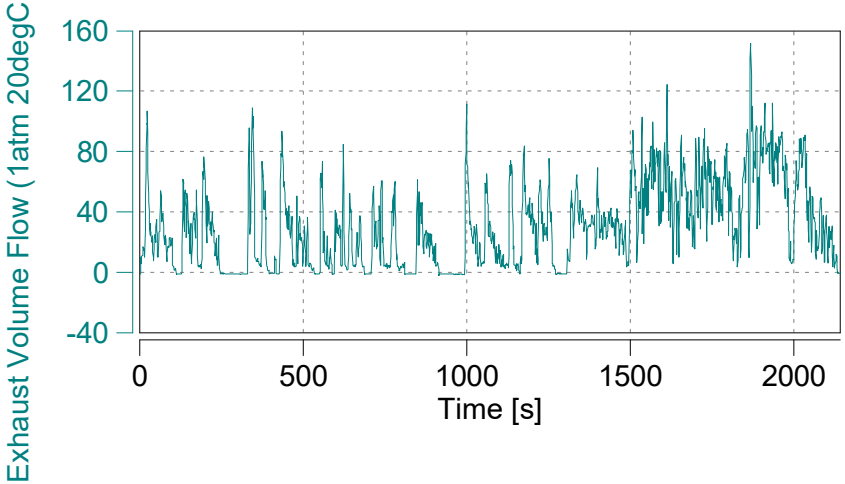
Case: 213-20667
Page: Exhaust Flow (1)

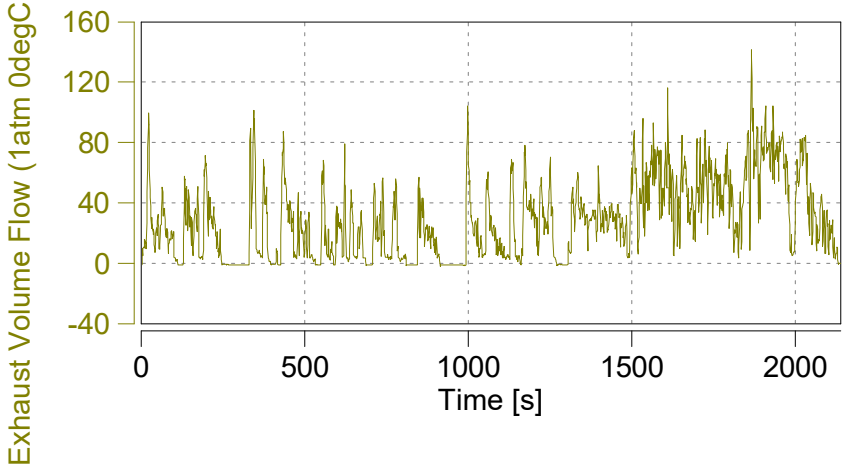
'213-20667 A2 Uphill'
Start Date: 04/14/2022
Start Time: 10:01:13.0

AVL
Concerto M.O.V.E, 2019









Concerto Version: 505 Build 171, Serial Number: 1604
M.O.V.E Post-Processing: DT_1R4.1_B340
Legislation:

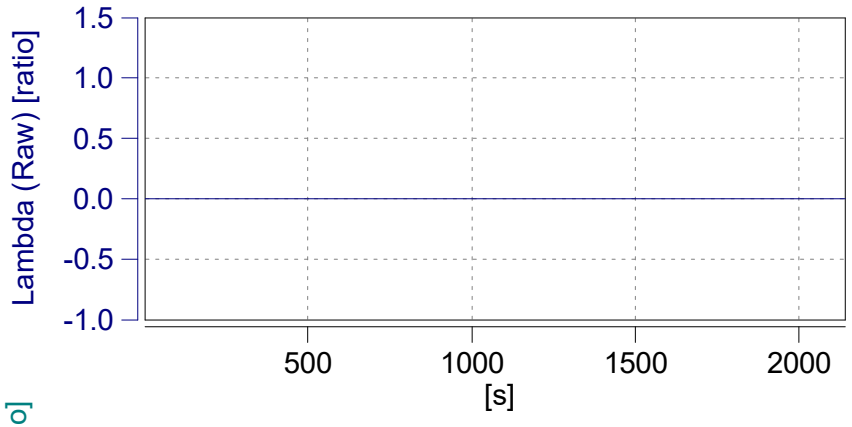
Vehicle: 213-20667 /
Engine: /
NOx Ambient Condition Corr.: 7 - CFR40 §1065.670
Dry / Wet Corr.: 2 - CFR40 §86.1342-90

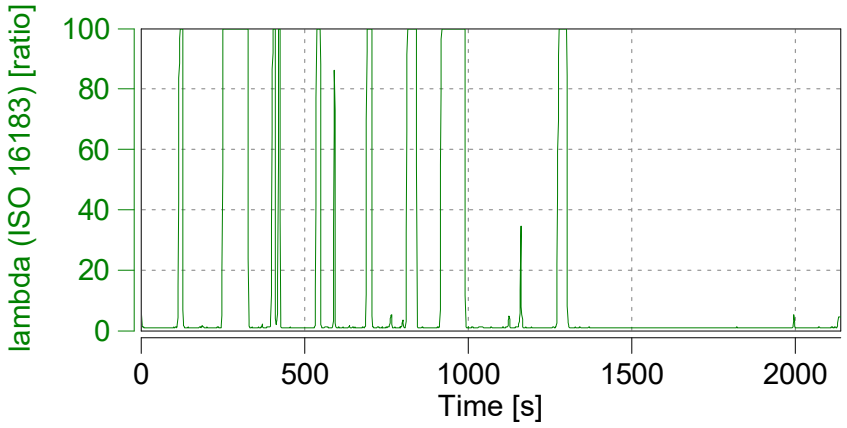
Case: 213-20667
Page: Exhaust Flow (2)

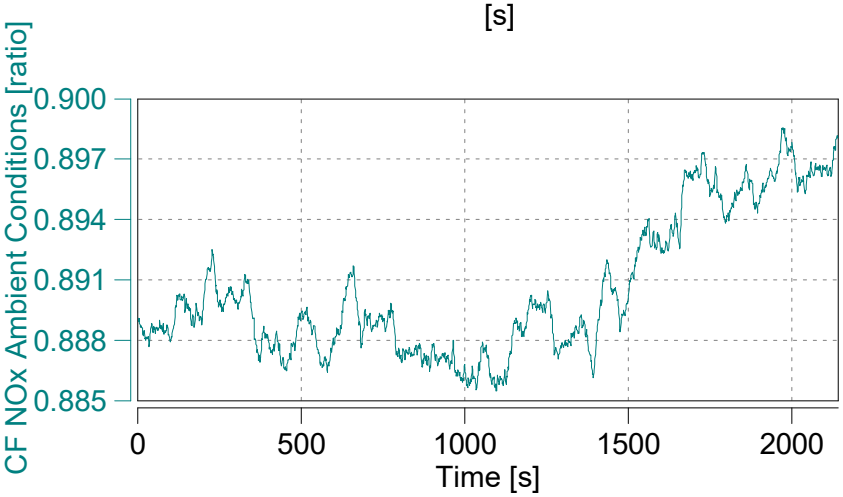
'213-20667 A2 Uphill'
Start Date: 04/14/2022
Start Time: 10:01:13.0

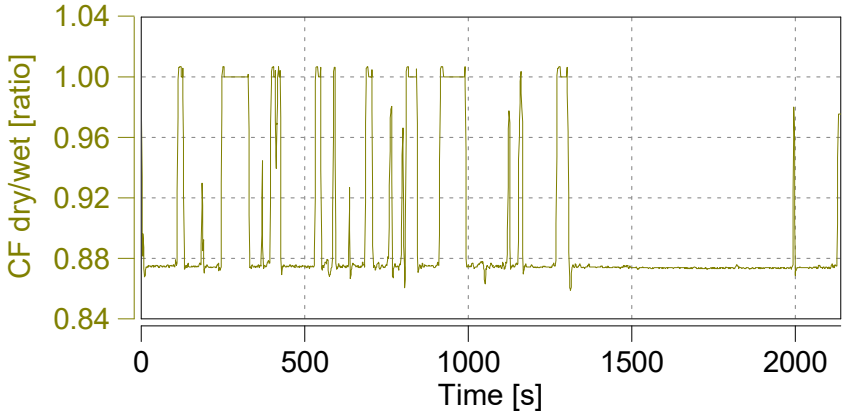
AVL

Concerto M.O.V.E, 2019









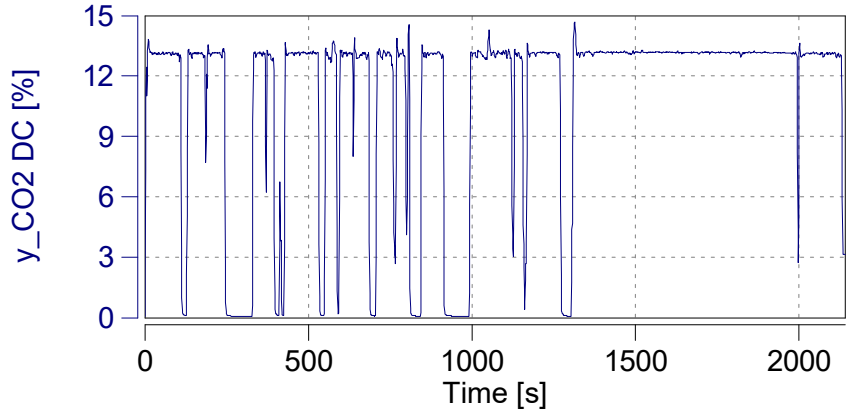
Concerto Version: 505 Build 171, Serial Number: 1604
M.O.V.E Post-Processing: DT_1R4.1_B340
Legislation:

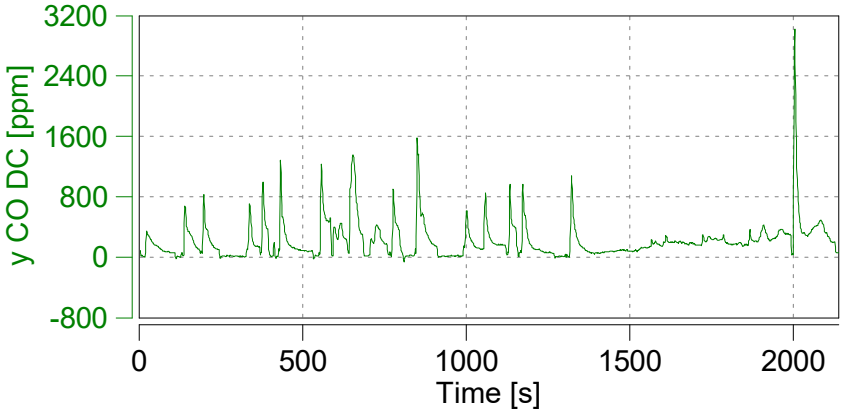
Vehicle: 213-20667 /
Engine: /
NOx Ambient Condition Corr.: 7 - CFR40 §1065.670
Dry / Wet Corr.: 2 - CFR40 §86.1342-90

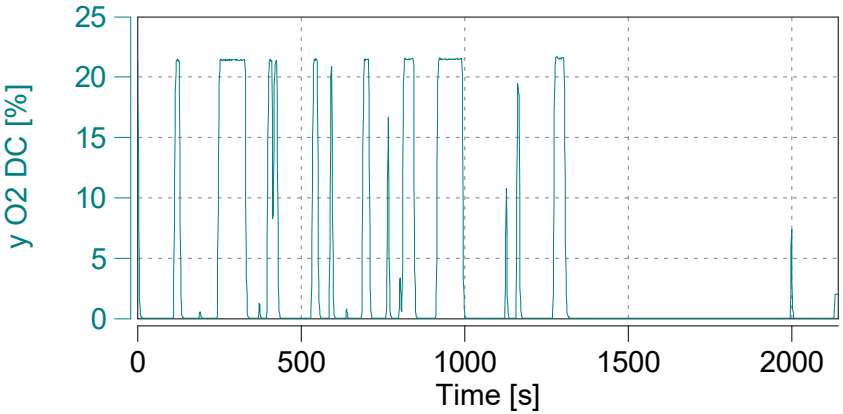
Case: 213-20667
Page: Corrected Emissions (1)

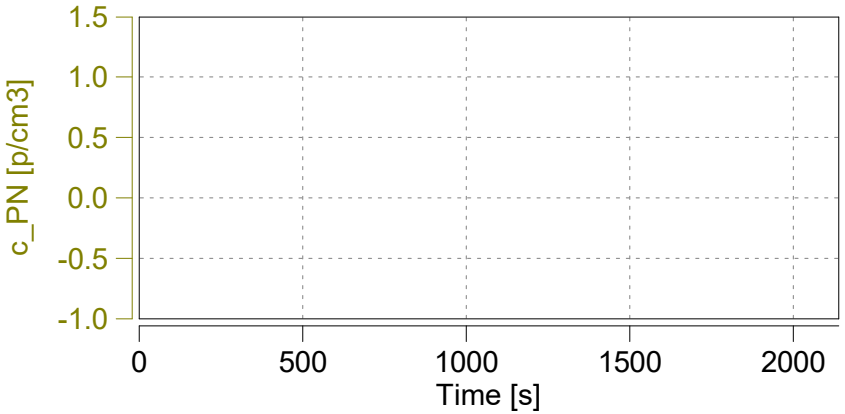
'213-20667 A2 Uphill'
Start Date: 04/14/2022
Start Time: 10:01:13.0

AVL
Concerto M.O.V.E, 2019









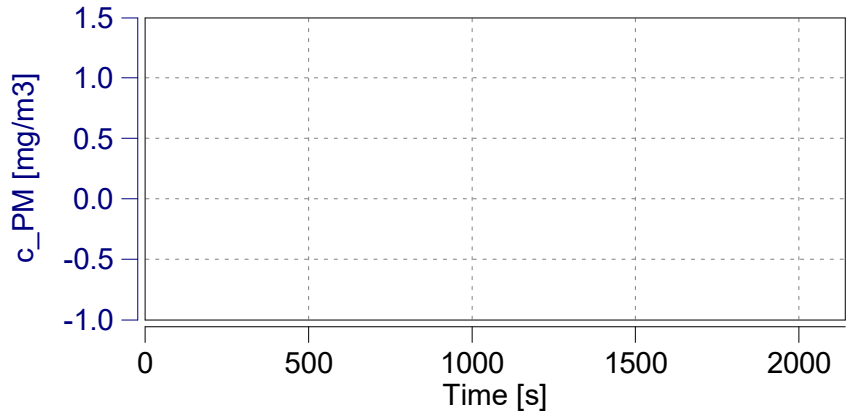
Concerto Version: 505 Build 171, Serial Number: 1604
M.O.V.E Post-Processing: DT_1R4.1_B340
Legislation:

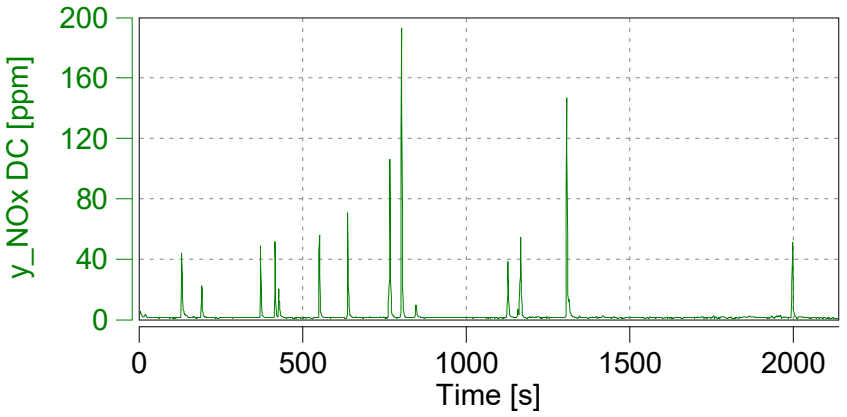
Vehicle: 213-20667 /
Engine: /
NOx Ambient Condition Corr.: 7 - CFR40 §1065.670
Dry / Wet Corr.: 2 - CFR40 §86.1342-90

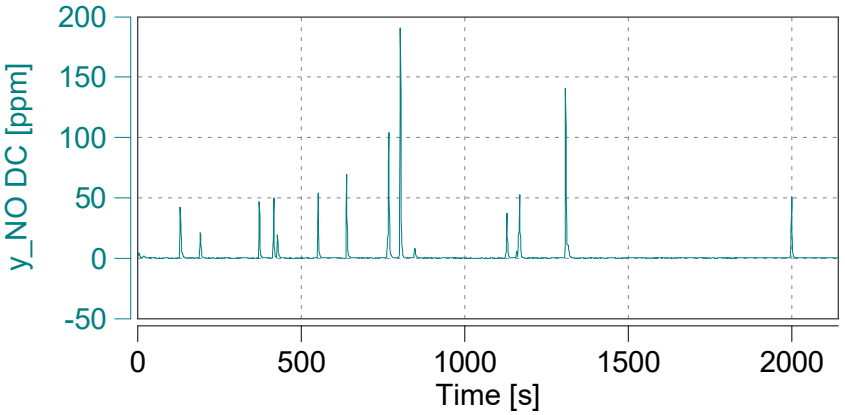
Case: 213-20667
Page: Corrected Emissions (2)

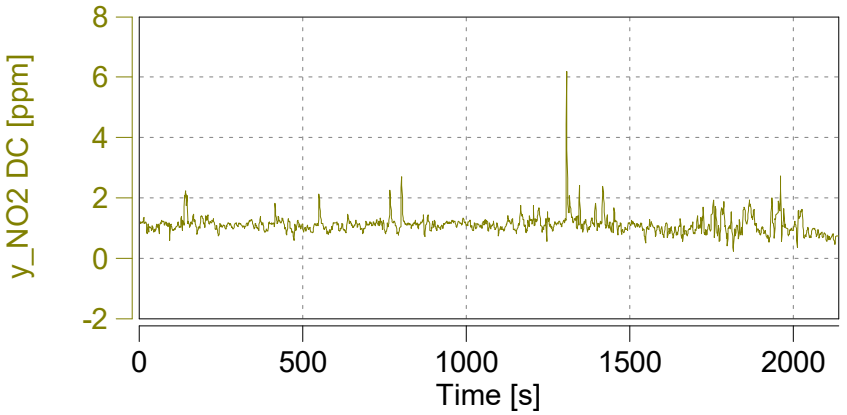
'213-20667 A2 Uphill'
Start Date: 04/14/2022
Start Time: 10:01:13.0

AVL
Concerto M.O.V.E, 2019









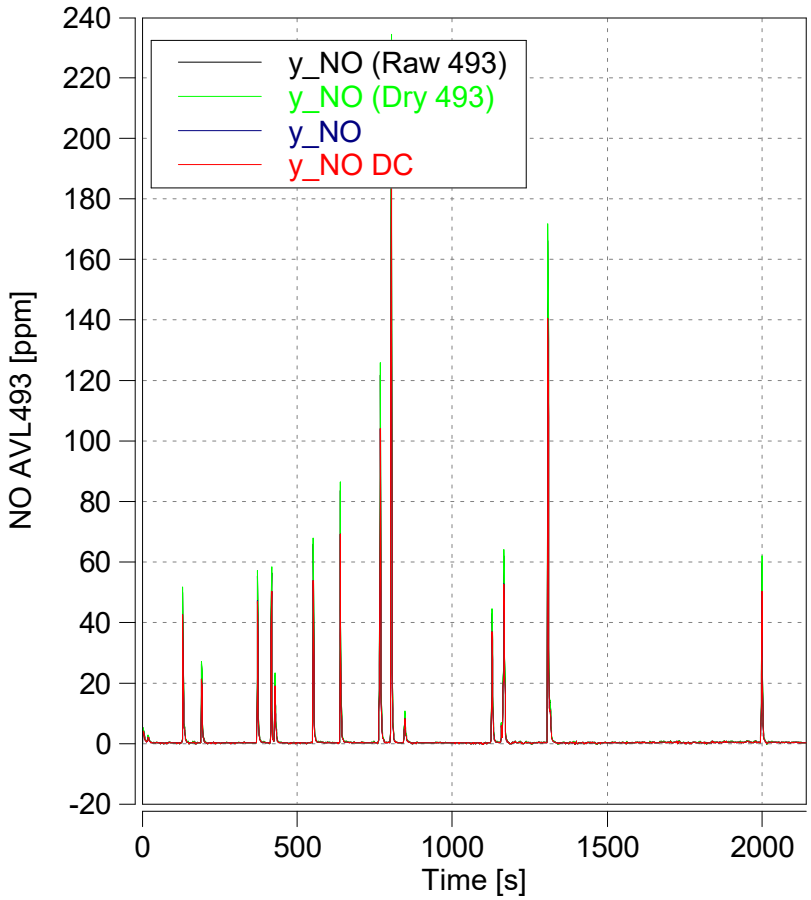
Concerto Version: 505 Build 171, Serial Number: 1604
M.O.V.E Post-Processing: DT_1R4.1_B340
Legislation:

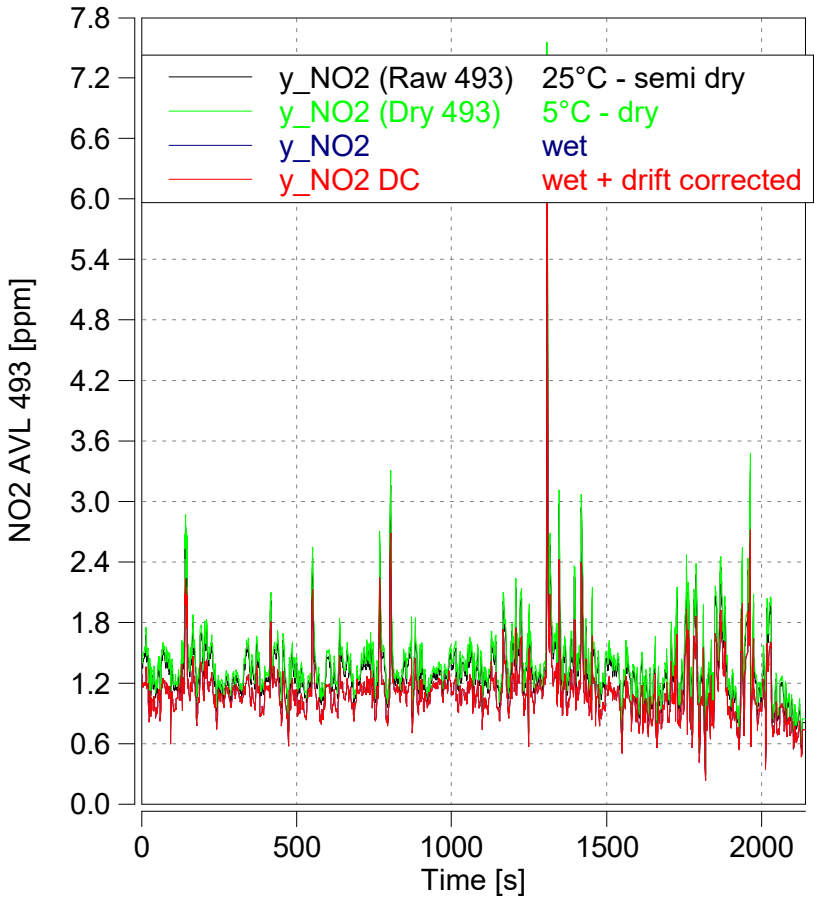
Vehicle: 213-20667 /
Engine: /
NOx Ambient Condition Corr.: 7 - CFR40 §1065.670
Dry / Wet Corr.: 2 - CFR40 §86.1342-90

Case: 213-20667
Page: Corrected Emissions (3)

'213-20667 A2 Uphill'
Start Date: 04/14/2022
Start Time: 10:01:13.0

AVL
Concerto M.O.V.E, 2019

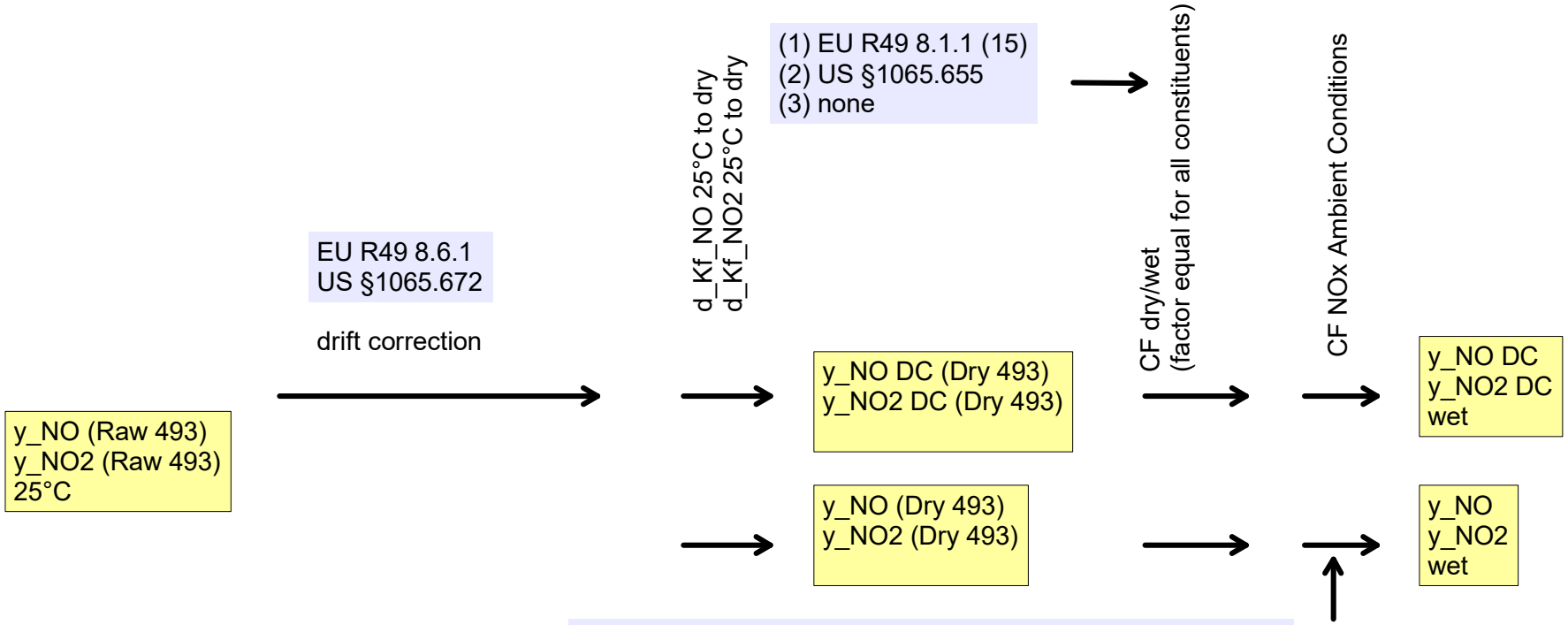




Concerto Version: 505 Build 171, Serial Number: 1604
M.O.V.E Post-Processing: DT_1R4.1_B340
Legislation:

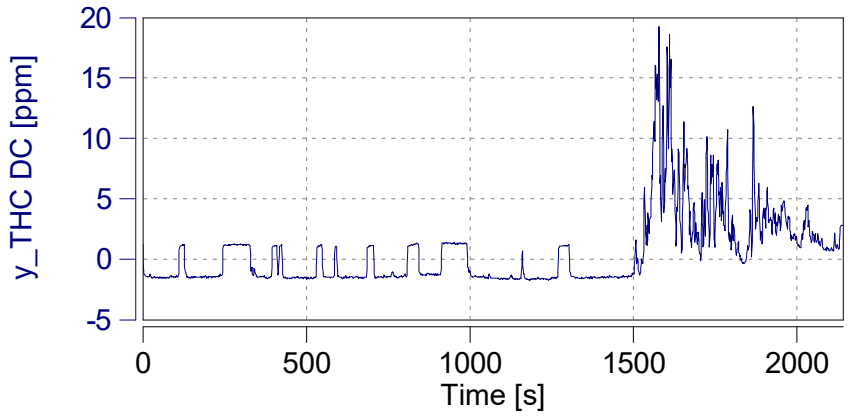
Vehicle: 213-20667 /
Engine: /
NOx Ambient Condition Corr.: 7 - CFR40 §1065.670
Dry / Wet Corr.: 2 - CFR40 §86.1342-90

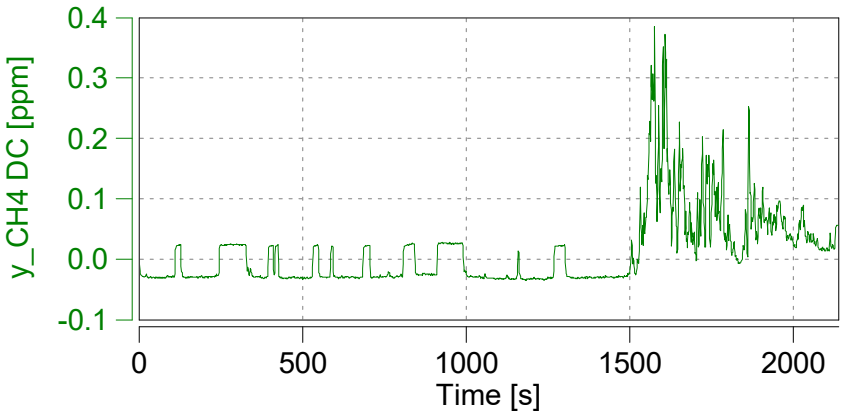
NOx - AVL 493

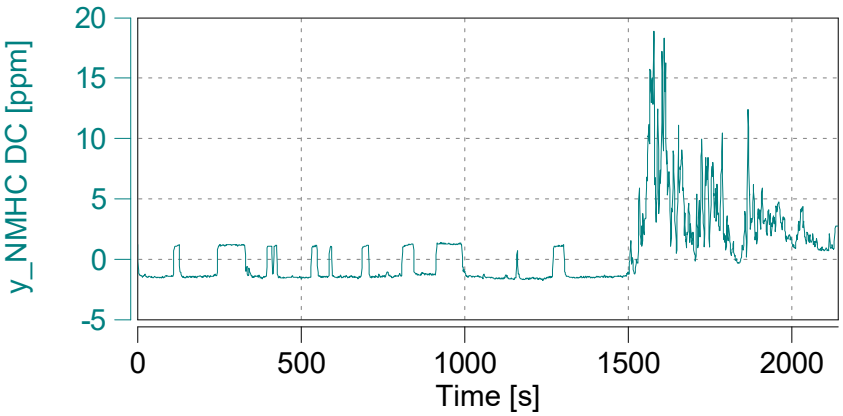

y_NO (Raw 493)
y_NO2 (Raw 493)
25°C
EU R49 8.6.1
US §1065.672
drift correction
d_Kf_NO 25°C to dry
d_Kf_NO2 25°C to dry
(1) EU R49 8.1.1 (15)
(2) US §1065.655
(3) none
y_NO DC (Dry 493)
y_NO2 DC (Dry 493)
y_NO (Dry 493)
y_NO2 (Dry 493)
CF dry/wet
(factor equal for all constituents)
CF NOx Ambient Conditions
y_NO DC
y_NO2 DC
wet
y_NO
y_NO2
wet
(1) HD Diesel Engine SwRI FinalReport 08-2597, 1999
(2) humidity only
(3) equivalent uncorrected NOx limit method for EU in service
(4) US §40.86.1342.94 Diesel
(5) US §40.86.1342.94 SI
(6) US §40.86.1370–2007 (default US)
(7) US 40.1065.670
(8) none (default EU)

'213-20667 A2 Uphill'
Start Date: 04/14/2022
Start Time: 10:01:13.0

AVL
Concerto M.O.V.E, 2019







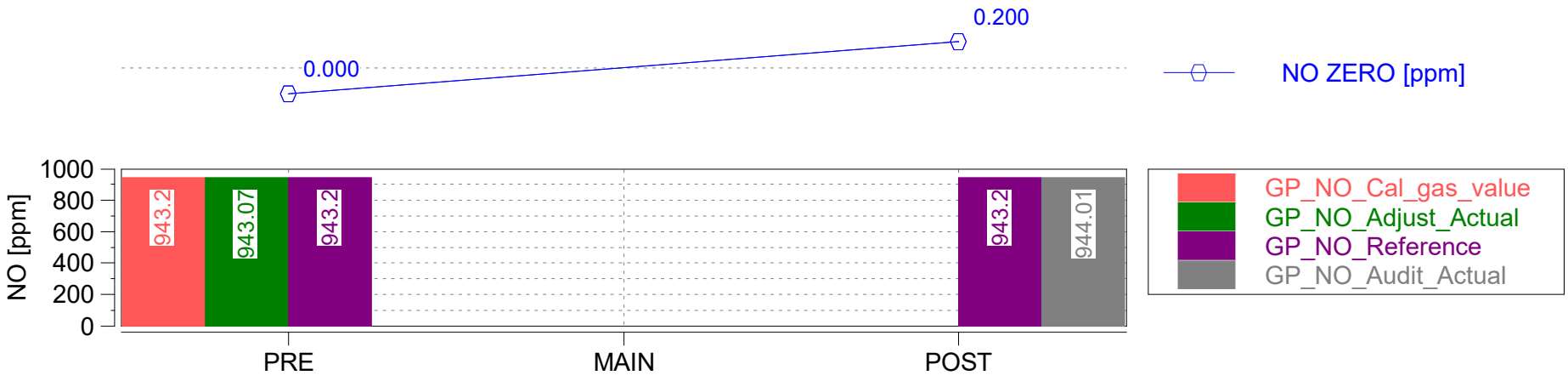
Concerto Version: 505 Build 171, Serial Number: 1604
M.O.V.E Post-Processing: DT_1R4.1_B340
Legislation:

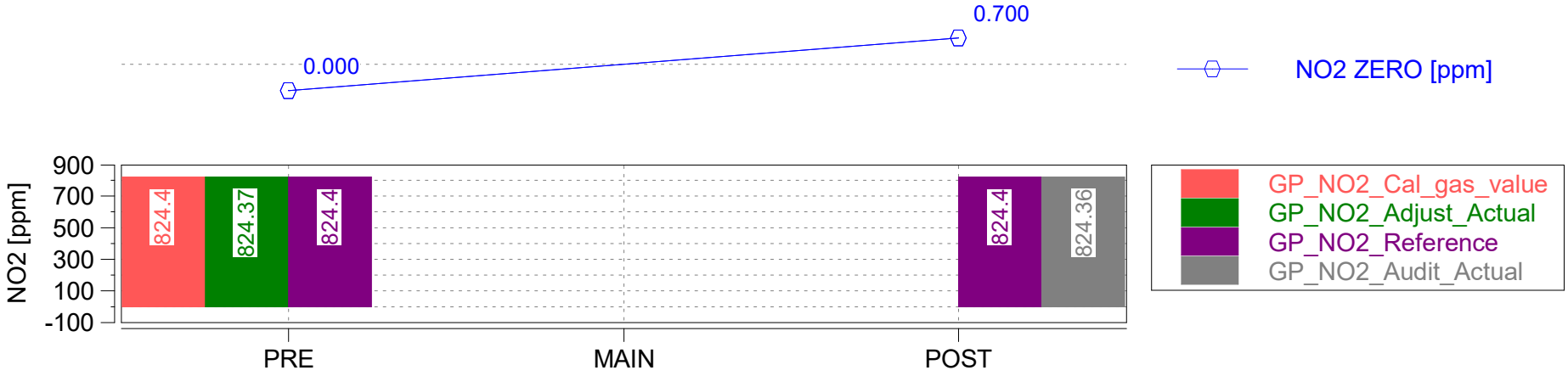
Vehicle: 213-20667 /
Engine: /
NOx Ambient Condition Corr.: 7 - CFR40 §1065.670
Dry / Wet Corr.: 2 - CFR40 §86.1342-90

Case: 213-20667
Page: NO/NO2/NOx Zero - Span

'213-20667 A2 Uphill'
Start Date: 04/14/2022
Start Time: 10:01:13.0

AVL
Concerto M.O.V.E, 2019





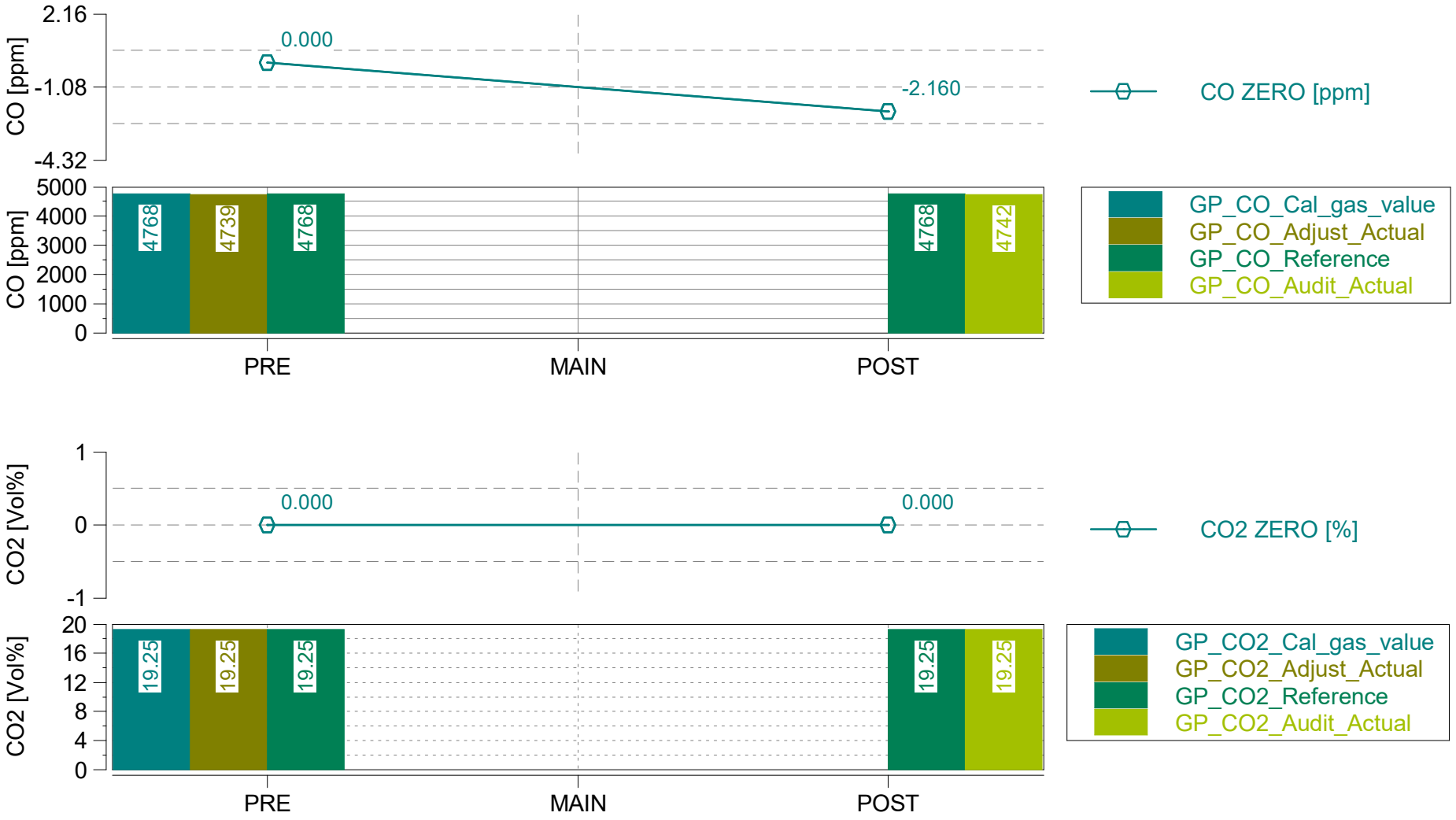
Concerto Version: 505 Build 171, Serial Number: 1604
M.O.V.E Post-Processing: DT_1R4.1_B340
Legislation:

Vehicle: 213-20667 /
Engine: /
NOx Ambient Condition Corr.: 7 - CFR40 §1065.670
Dry / Wet Corr.: 2 - CFR40 §86.1342-90

Case: 213-20667
Page: CO/CO2 Zero - Span

'213-20667 A2 Uphill'
Start Date: 04/14/2022
Start Time: 10:01:13.0

AVL
Concerto M.O.V.E, 2019



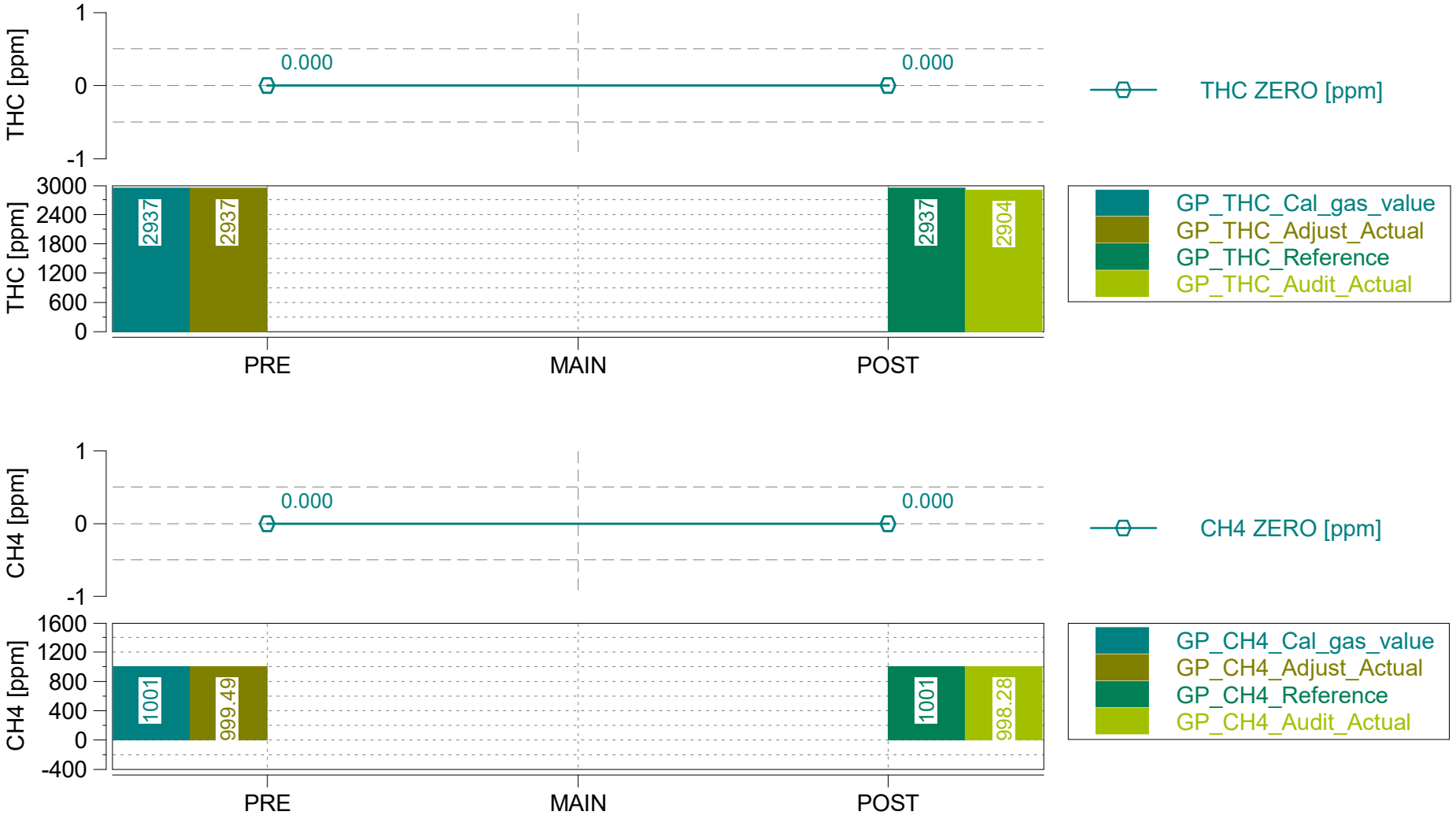
Concerto Version: 505 Build 171, Serial Number: 1604
M.O.V.E Post-Processing: DT_1R4.1_B340
Legislation:

Vehicle: 213-20667 /
Engine: /
NOx Ambient Condition Corr.: 7 - CFR40 §1065.670
Dry / Wet Corr.: 2 - CFR40 §86.1342-90

Case: 213-20667
Page: THC/CH4 Zero - Span

'213-20667 A2 Uphill'
Start Date: 04/14/2022
Start Time: 10:01:13.0

AVL
Concerto M.O.V.E, 2019



Concerto Version: 505 Build 171, Serial Number: 1604
M.O.V.E Post-Processing: DT_1R4.1_B340
Legislation:

Vehicle: 213-20667 /
Engine: /
NOx Ambient Condition Corr.: 7 - CFR40 §1065.670
Dry / Wet Corr.: 2 - CFR40 §86.1342-90

§	criterium	condition	value	unit	pass/fail
GAS Leak Check	The leakage rate on the vacuum side shall not exceed 0.5 per cent of the in-use flow rate for the portion of the system being checked.	The leakage rate <= 0.5%	**0.00**	**%**	pass
PN Leak Check	n/a	n/a	**n/a**	**n/a**	n/a
PM Leak Check	n/a	n/a	**n/a**	**n/a**	n/a

GAS PEMS Devices

Device ID	AVL492
Serial Number	0625
Firmware Version	V1.17
Main Test Date	2022-04-14
Leak Check Age [days]	0

Device ID	AVL4925iS
Serial Number	184
Firmware Version	1.22.0.4

EFM

Device ID	AVL495
Serial Number	00826
Serial Number Tube	01080
Firmware Version	V1.16

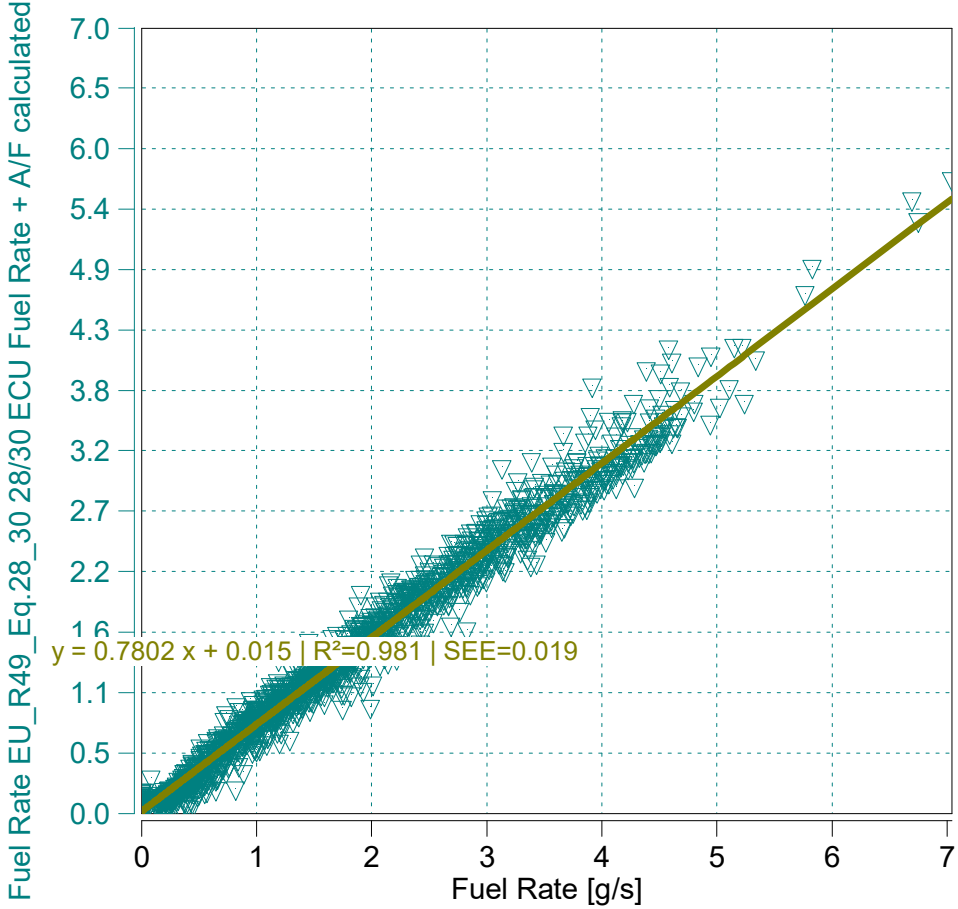
System Control

SC Version	V2.9_237
SC Serial Number	60300923

Case: 213-20667
Page: Fuel Rate ECU vs. Calculated

'213-20667 A2 Uphill'
Start Date: 04/14/2022
Start Time: 10:01:13.0

AVL
Concerto M.O.V.E, 2019



EU 582/2011/Appendix I/3.2.1 | Fuel Rate ECU and calculated

y = 0.7802 x + 0.015 | R²=0.981 | SEE=0.019
m = 0.78 (0.9 - 1.1 recommended)
R² = 0.98 (min 0.9 mandatory)

Data from - to [% of Maximum]

0 100

Concerto Version: 505 Build 171, Serial Number: 1604
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NOx Ambient Condition Corr.: 7 - CFR40 §1065.670
Dry / Wet Corr.: 2 - CFR40 §86.1342-90

Case: 213-20667
Page: Trip Summary

'213-20667 B1 Downhill'
Start Date: 04/14/2022
Start Time: 10:01:13.0

AVL
Concerto M.O.V.E, 2019

Trip Duration	2073.00	s
Trip Duration (a)	2073.00	s
Trip Distance	18.19	mi
Trip Distance (a)	18.19	mi
Trip Fuel Cons. (b)	1.11	kg
Trip Fuel Cons. (ab)	1.11	kg
Trip Fuel Cons. EU (ac)	0.94	kg
Trip Fuel Cons. US (ac)	0.94	kg
Trip Fuel Economy (b)	46.49	mpg_US
Trip Fuel Economy (ab)	46.49	mpg_US
Trip Fuel Economy EU (ac)	54.84	mpg_US
Trip Fuel Economy US (ac)	54.85	mpg_US
Trip Fuel Economy GGE (b)	46.49	mpg_US
Trip Fuel Economy GGE (ab)	46.49	mpg_US
Trip Fuel Economy EU GGE (ac)	54.84	mpg_US
Trip Fuel Economy US GGE (ac)	54.85	mpg_US
Trip Av. Eng. Speed	1256.84	rpm
Trip Av. Torque	27.52	lbft
Trip Av. Power	8.61	hp
Trip Work		
Trip Work (a)	4.96	hphr
Trip Exhaust Mass	16.09	kg
Trip Exhaust Mass EU (ac)	18.30	kg
Trip Exhaust Mass US (ac)	18.39	kg
Trip Av. Amb. Temperature	72.95	deg_F
Trip Av. Humidity	21.52	%
Trip Av. GPS Altitude	509.12	m
Fuel Type	Petrol (E10)	

ave THC	-0.66704	ppm
ave NMHC	-0.65370	ppm
ave CH4	-0.01334	ppm
ave CO	106.53685	ppm
ave CO2	7.52333	%
ave NOx	5.26745	ppm
ave PM	n/a	mg/m3
ave Soot meas	n/a	mg/m3
ave Soot	n/a	mg/m3
ave PN	n/a	#/cm3
tot THC	0.00316	g
tot NMHC	0.00292	g
tot CH4	0.00007	g
tot CO	2.54438	g
tot CO2	2853.66409	g
tot NO (d)	0.11771	g
tot NO2	0.03213	g
tot NOx	0.14981	g
tot Soot	n/a	g
tot Soot meas	n/a	g
tot PM	n/a	g
tot PN	n/a	#
PM measurement type	0.00000	-
tot Soot on PM filter (estim.)	0.00000	mg
Soot --> PM simple scaling factor	1.00000	-
Trip Av. Veh. Speed	31.58617	mi/hr
Trip Distance Share Urban	17.98868	% distanc
Trip Distance Share Rural	57.59163	% distanc
Trip Distance Share Motorway	24.41970	% distanc

BS CO2	575.85354	g/hphr
BS CO	0.51344	g/hphr
BS THC	0.00064	g/hphr
BS NMHC	0.00059	g/hphr
BS CH4	0.00001	g/hphr
BS NO (d)	0.02375	g/hphr
BS NO2	0.00648	g/hphr
BS NOx	0.03023	g/hphr
BS Soot	n/a	g/hphr
BS Soot meas	n/a	g/hphr
BS PM	n/a	g/hphr
BS PN	n/a	#/hpr
DS CO2	156.89500	g/mi
DS CO	0.13989	g/mi
DS THC	0.00017	g/mi
DS NMHC	0.00016	g/mi
DS CH4	0.00000	g/mi
DS NO (d)	0.00647	g/mi
DS NO2	0.00177	g/mi
DS NOx	0.00824	g/mi
DS Soot	n/a	g/mi
DS Soot meas	n/a	g/mi
DS PM	n/a	g/mi
DS PN	n/a	#/mi
FS CO2	2577.79467	g/kg
FS CO	2.29841	g/kg
FS THC	0.00285	g/kg
FS NMHC	0.00264	g/kg
FS CH4	0.00006	g/kg
FS NO (d)	0.10633	g/kg
FS NO2	0.02903	g/kg
FS NOx	0.13533	g/kg
FS Soot	n/a	g/kg
FS Soot meas	n/a	g/kg
FS PM	n/a	g/kg
FS PN	n/a	#/kg

(a) GAS PEMS measurement state only, (b) based on fuel rate input (ECU, Fuel Meter), (c) Based on A/F ratio (eq 28-32 - R49)
(d) NO calculated using molecular weight of NO2, GGE=Gasoline Gallon Equivalents

Concerto Version: 505 Build 171, Serial Number: 1604
M.O.V.E Post-Processing: DT_1R4.1_B340
Legislation:

Vehicle: 213-20667 /
Engine: /
NOx Ambient Condition Corr.: 7 - CFR40 §1065.670
Dry / Wet Corr.: 2 - CFR40 §86.1342-90

Case: 213-20667
Page: Trip Summary Drift Corrected

'213-20667 B1 Downhill'
Start Date: 04/14/2022
Start Time: 10:01:13.0

AVL
Concerto M.O.V.E, 2019

Trip Duration	2073.00	s
Trip Duration (a)	2073.00	s
Trip Distance	18.19	mi
Trip Distance (a)	18.19	mi
Trip Fuel Cons. (b)	1.11	kg
Trip Fuel Cons. (ab)	1.11	kg
Trip Fuel Cons. EU (ac)	0.94	kg
Trip Fuel Cons. US (ac)	0.94	kg
Trip Fuel Economy (b)	46.49	mpg_US
Trip Fuel Economy (ab)	46.49	mpg_US
Trip Fuel Economy EU (ac)	54.84	mpg_US
Trip Fuel Economy US (ac)	54.85	mpg_US
Trip Fuel Economy GGE (b)	46.49	mpg_US
Trip Fuel Economy GGE (ab)	46.49	mpg_US
Trip Fuel Economy EU GGE (ac)	54.84	mpg_US
Trip Fuel Economy US GGE (ac)	54.85	mpg_US
Trip Av. Eng. Speed	1256.84	rpm
Trip Av. Torque	27.52	lbft
Trip Av. Power	8.61	hp
Trip Work		
Trip Work (a)	4.96	hphr
Trip Exhaust Mass	16.09	kg
Trip Exhaust Mass EU (ac)	18.30	kg
Trip Exhaust Mass US (ac)	18.39	kg
Trip Av. Amb. Temperature	72.95	deg_F
Trip Av. Humidity	21.52	%
Trip Av. GPS Altitude	509.12	m
Fuel Type	Petrol (E10)	

ave THC DC	-0.67086	ppm
ave NMHC DC	-0.65744	ppm
ave CH4 DC	-0.01342	ppm
ave CO DC	107.14460	ppm
ave CO2 DC	7.52333	%
ave NOx DC	5.26603	ppm
ave PM	n/a	mg/m3
ave Soot meas	n/a	mg/m3
ave Soot	n/a	mg/m3
ave PN DC		
tot THC DC	0.00317	g
tot NMHC DC	0.00294	g
tot CH4 DC	0.00007	g
tot CO DC	2.55889	g
tot CO2 DC	2853.66409	g
tot NO DC (d)	0.11766	g
tot NO2 DC	0.03213	g
tot NOx DC	0.14977	g
tot Soot	n/a	g
tot Soot meas	n/a	g
tot PM	n/a	g
tot PN DC		
PM measurement type	0.00000	-
tot Soot on PM filter (estim.)	0.00000	mg
Soot --> PM simple scaling factor	1.00000	-
Trip Av. Veh. Speed	31.58617	mi/hr
Trip Distance Share Urban	17.98868	% distanc
Trip Distance Share Rural	57.59163	% distanc
Trip Distance Share Motorway	24.41970	% distanc

BS CO2 DC	575.85354	g/hphr
BS CO DC	0.51637	g/hphr
BS THC DC	0.00064	g/hphr
BS NMHC DC	0.00059	g/hphr
BS CH4 DC	0.00001	g/hphr
BS NO DC (d)	0.02374	g/hphr
BS NO2 DC	0.00648	g/hphr
BS NOx DC	0.03022	g/hphr
BS Soot	n/a	g/hphr
BS Soot meas	n/a	g/hphr
BS PM	n/a	g/hphr
BS PN DC		
DS CO2 DC	156.89500	g/mi
DS CO DC	0.14069	g/mi
DS THC DC	0.00017	g/mi
DS NMHC DC	0.00016	g/mi
DS CH4 DC	0.00000	g/mi
DS NO DC (d)	0.00647	g/mi
DS NO2 DC	0.00177	g/mi
DS NOx DC	0.00823	g/mi
DS Soot	n/a	g/mi
DS Soot meas	n/a	g/mi
DS PM	n/a	g/mi
DS PN DC		
FS CO2 DC	2577.79467	g/kg
FS CO DC	2.31152	g/kg
FS THC DC	0.00287	g/kg
FS NMHC DC	0.00265	g/kg
FS CH4 DC	0.00006	g/kg
FS NO DC (d)	0.10629	g/kg
FS NO2 DC	0.02903	g/kg
FS NOx DC	0.13529	g/kg
FS Soot	n/a	g/kg
FS Soot meas	n/a	g/kg
FS PM	n/a	g/kg
FS PN DC		

(a) GAS PEMS measurement state only, (b) based on fuel rate input (ECU, Fuel Meter), (c) Based on A/F ratio (eq 28-32 - R49)
(d) NO calculated using molecular weight of NO2, GGE=Gasoline Gallon Equivalents

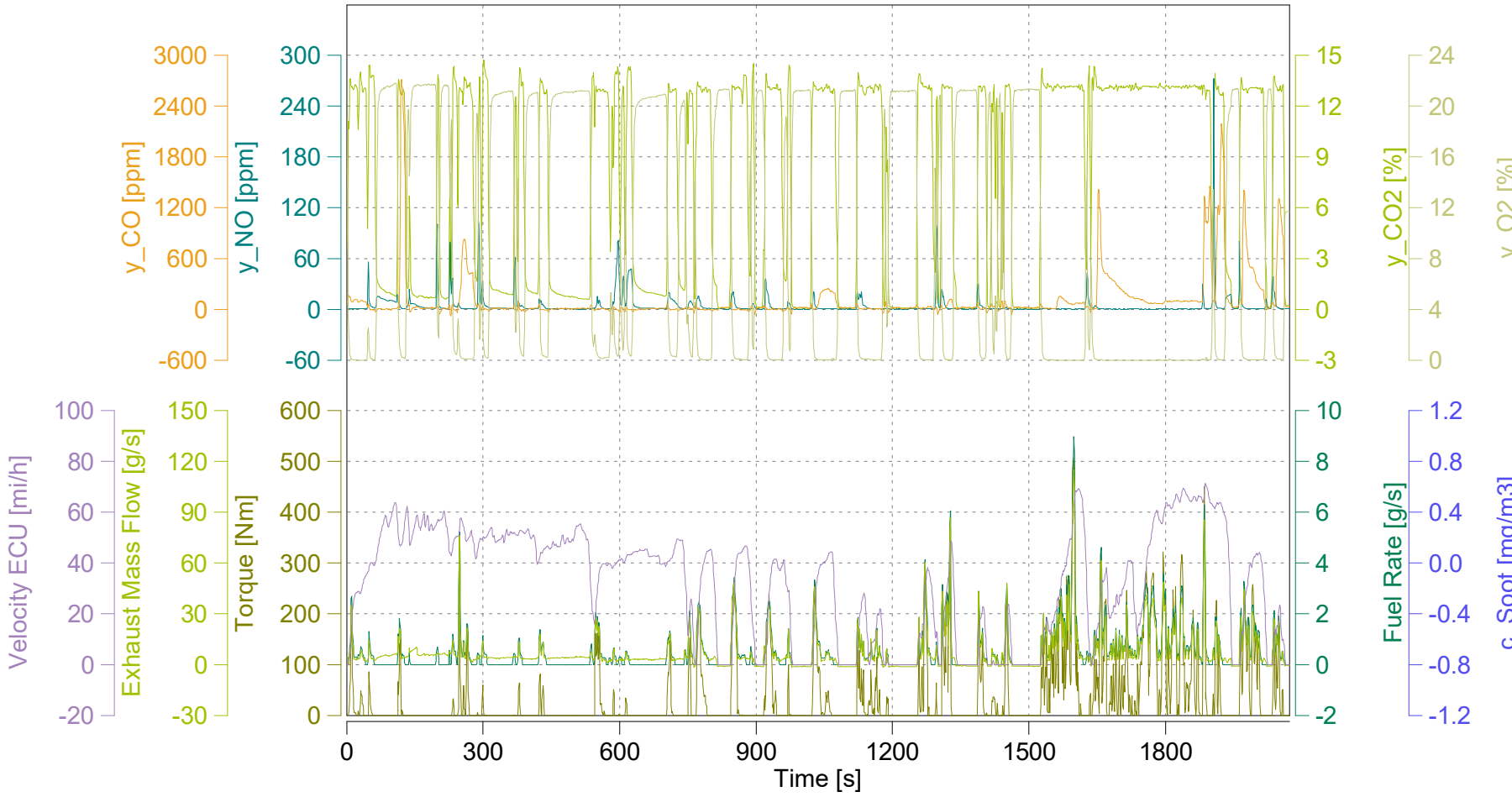
Concerto Version: 505 Build 171, Serial Number: 1604
M.O.V.E Post-Processing: DT_1R4.1_B340
Legislation:

Vehicle: 213-20667 /
Engine: /
NOx Ambient Condition Corr.: 7 - CFR40 §1065.670
Dry / Wet Corr.: 2 - CFR40 §86.1342-90

Case: 213-20667
Page: Time Alignment Check

'213-20667 B1 Downhill'
Start Date: 04/14/2022
Start Time: 10:01:13.0

Concerto



Absolute Time

y_THC
y_NO
y_CO2
y_O2
c_Soot
Fuel Rate
Exhaust Mass
Torque
Velocity ECU

AVL 492 Defa

THC
NO/NO2
CO/CO2
O2

Apply Defa

Alignment Pl

Reset Time
Reset Al
Apply Curr

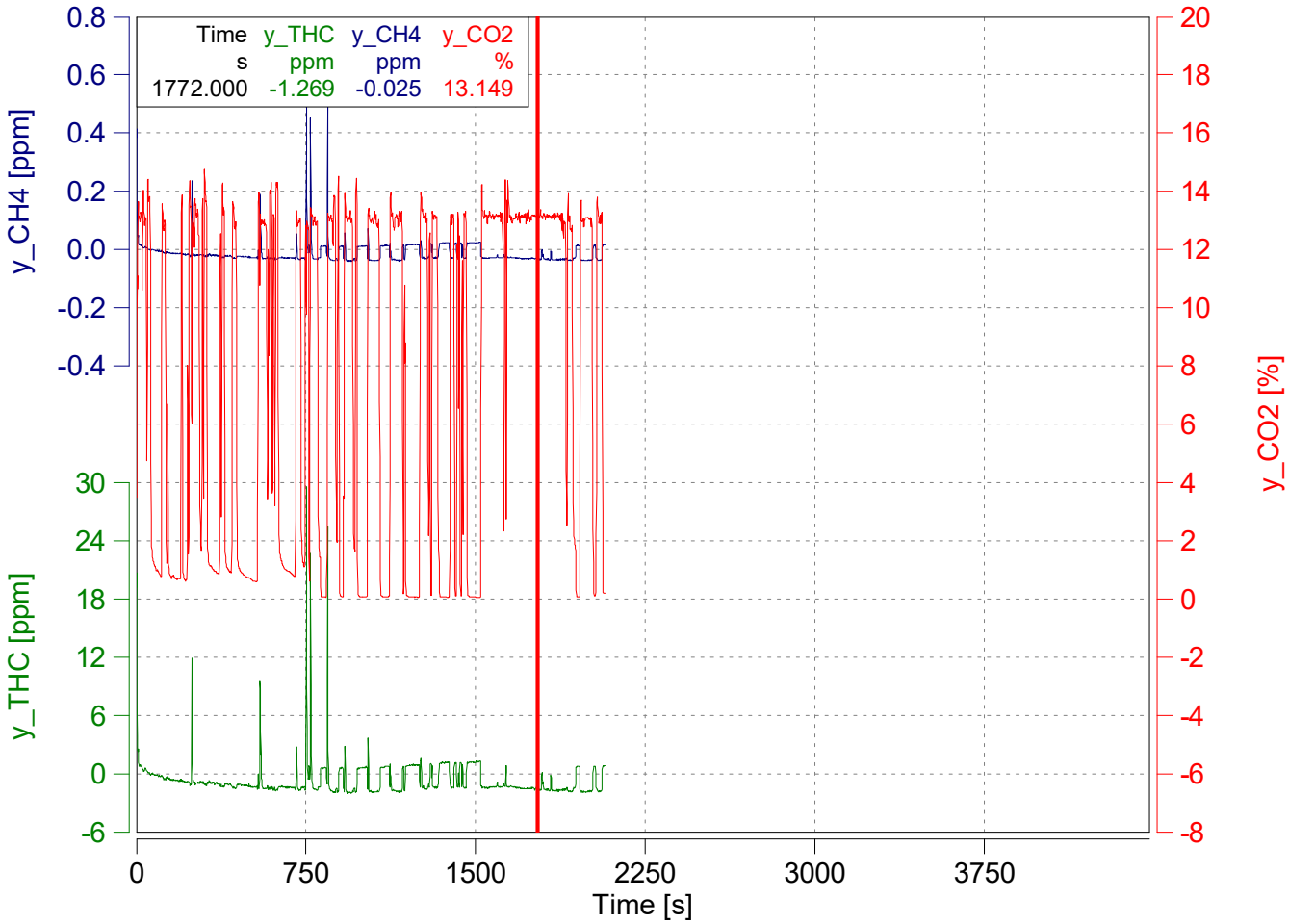
Concerto Version: 505 Build 171, Serial Number: 1604
M.O.V.E Post-Processing: DT_1R4.1_B340
Legislation:

Vehicle: 213-20667 /
Engine: /
NOx Ambient Condition Corr.: 7 - CFR40 §1065.670
Dry / Wet Corr.: 2 - CFR40 §86.1342-90

Case: 213-20667
Page: Time Alignment of Gas Concentrations

'213-20667 B1 Downhill'
Start Date: 04/14/2022
Start Time: 10:01:13.0

AVL
Concerto M.O.V.E, 2019



Absolute Time Shifts

y_THC	s	-4.3
y_CH4	s	-6.3

Reset Time Shifts in Plot

Apply Current Values

Concerto Version: 505 Build 171, Serial Number: 1604
M.O.V.E Post-Processing: DT_1R4.1_B340
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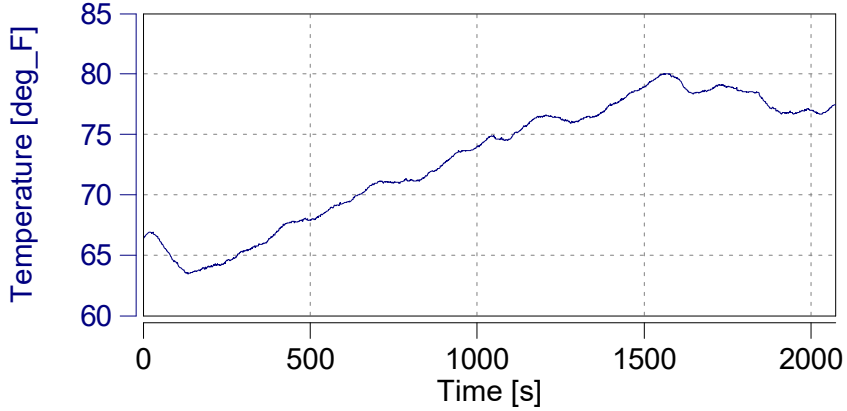
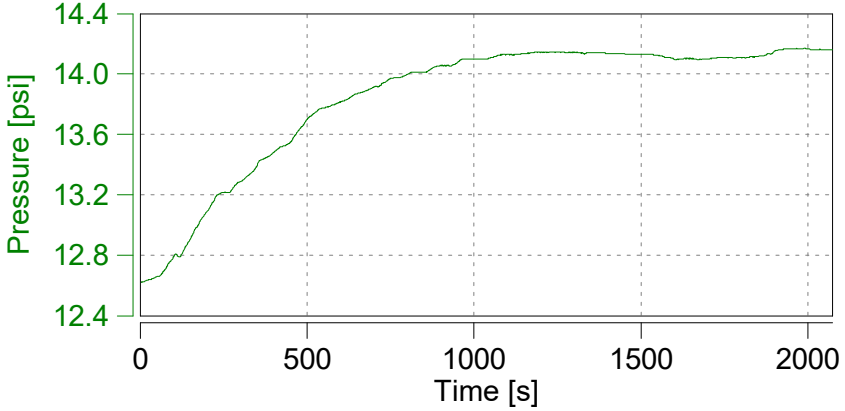
Engine: /
NOx Ambient Condition Corr.: 7 - CFR40 §1065.670
Dry / Wet Corr.: 2 - CFR40 §86.1342-90

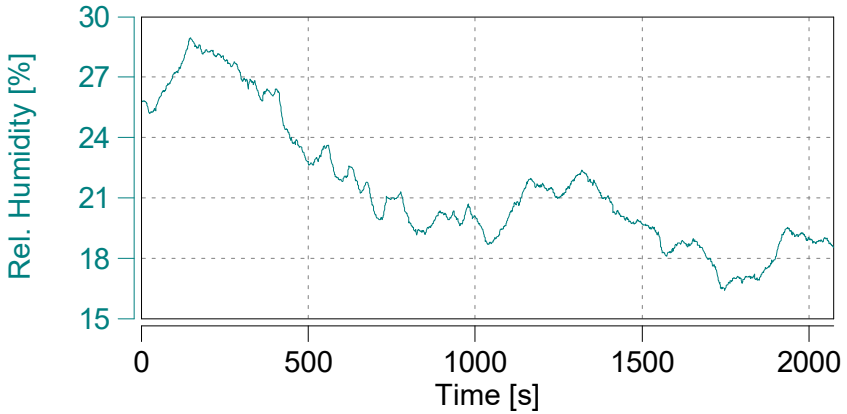
Case: 213-20667
Page: Ambient Conditions

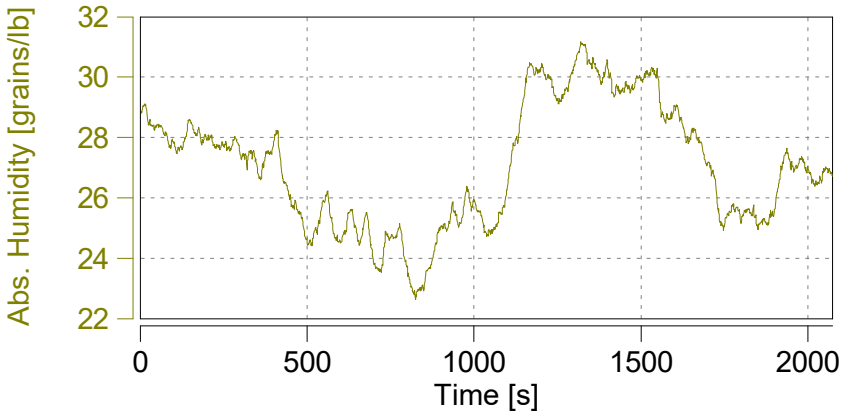
'213-20667 B1 Downhill'
Start Date: 04/14/2022
Start Time: 10:01:13.0

AVL
Concerto M.O.V.E, 2019









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Case: 213-20667
Page: GPS

'213-20667 B1 Downhill'
Start Date: 04/14/2022
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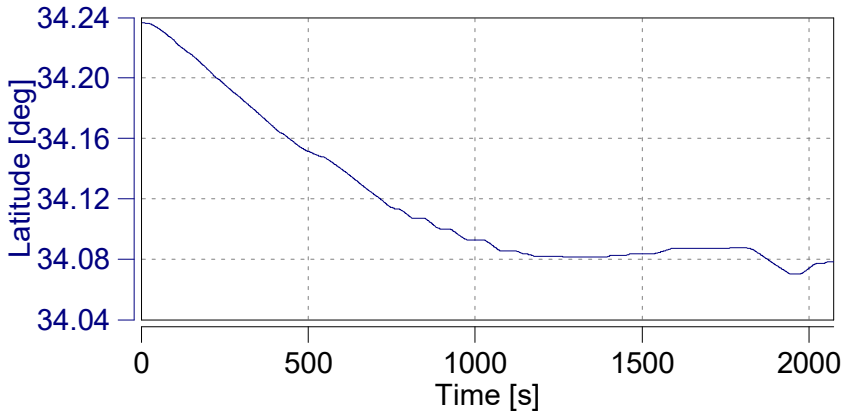
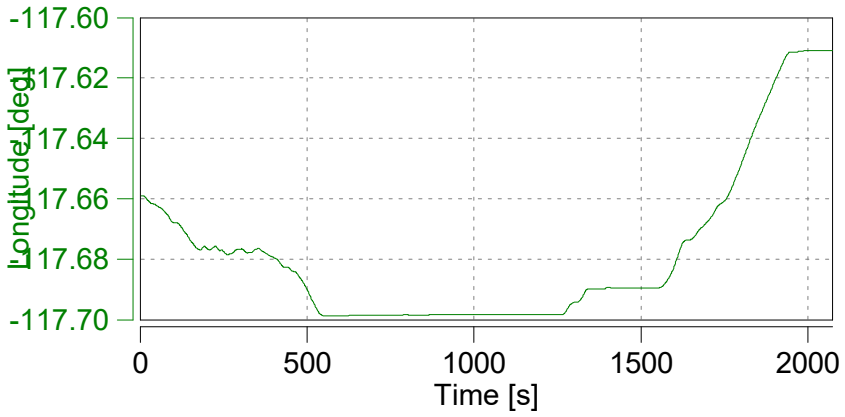
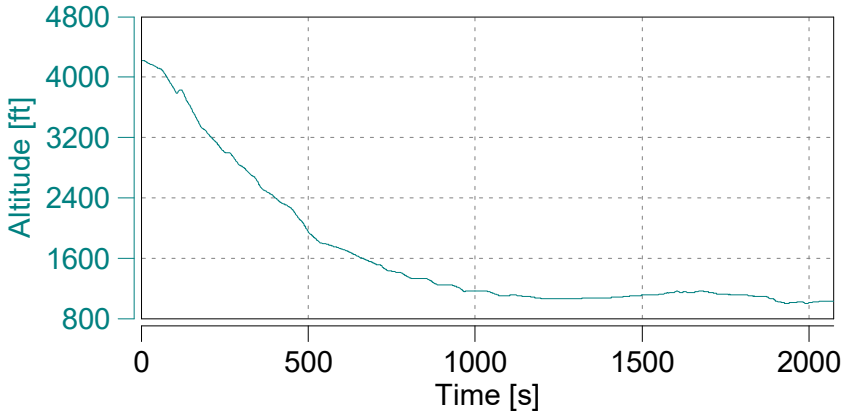
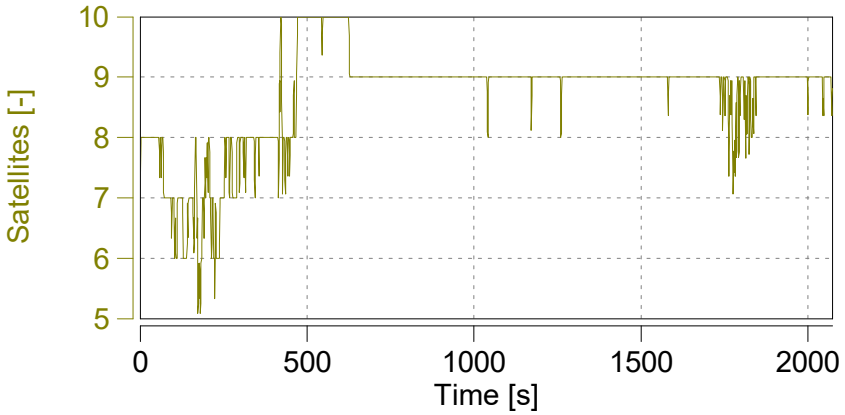
AVL
Concerto M.O.V.E, 2019









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Case: 213-20667
Page: Engine (1)

'213-20667 B1 Downhill'
Start Date: 04/14/2022
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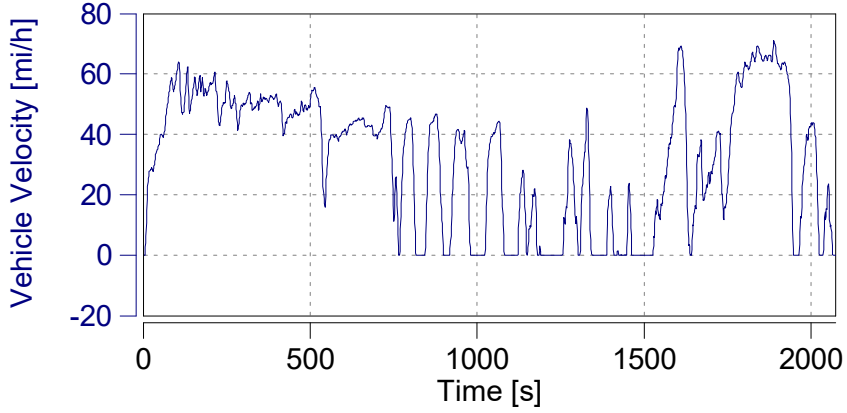
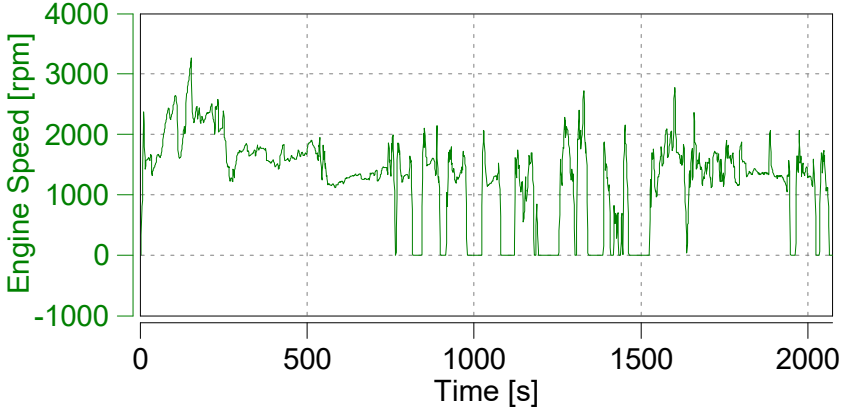
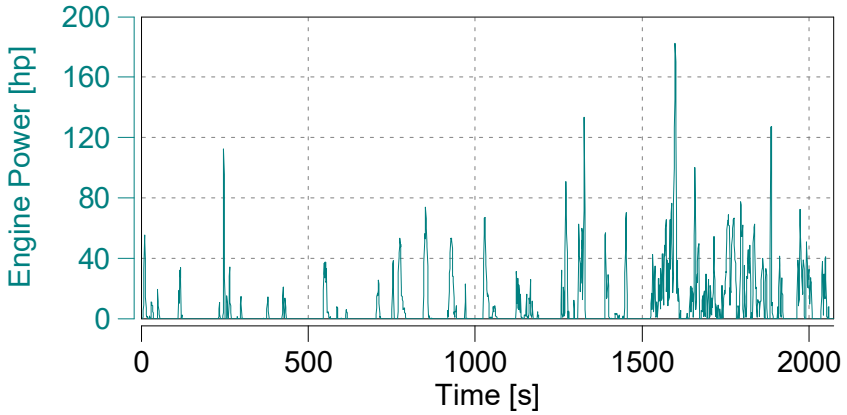
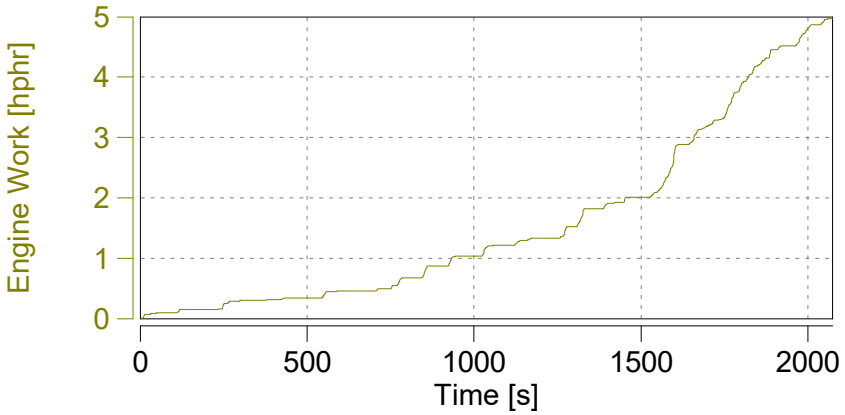
AVL
Concerto M.O.V.E, 2019









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Case: 213-20667
Page: Engine (2)

'213-20667 B1 Downhill'
Start Date: 04/14/2022
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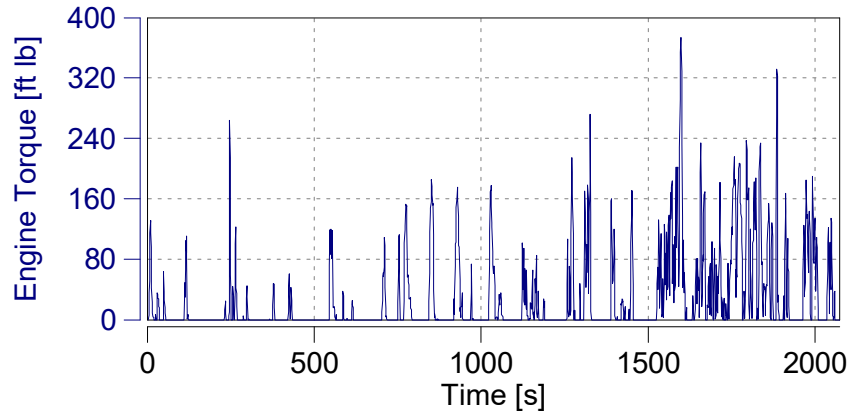

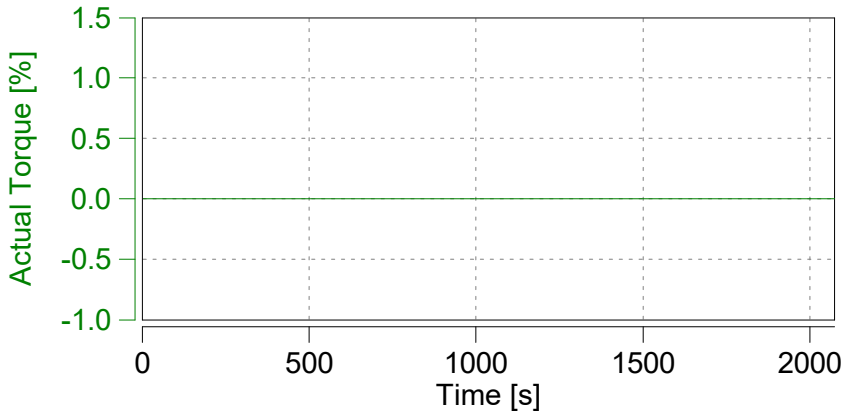

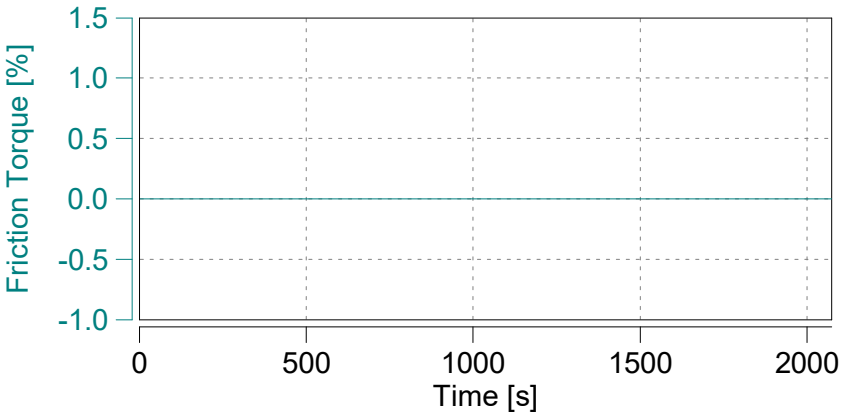

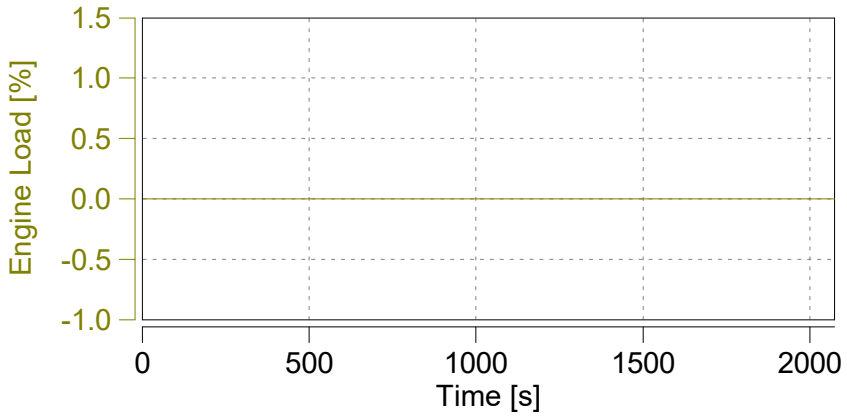

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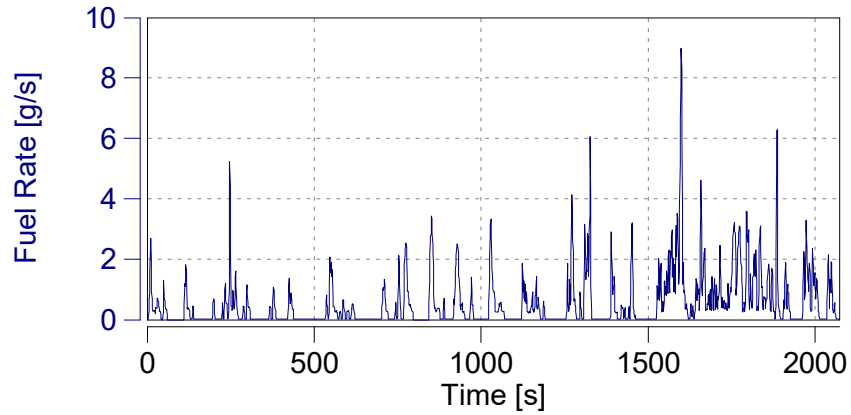
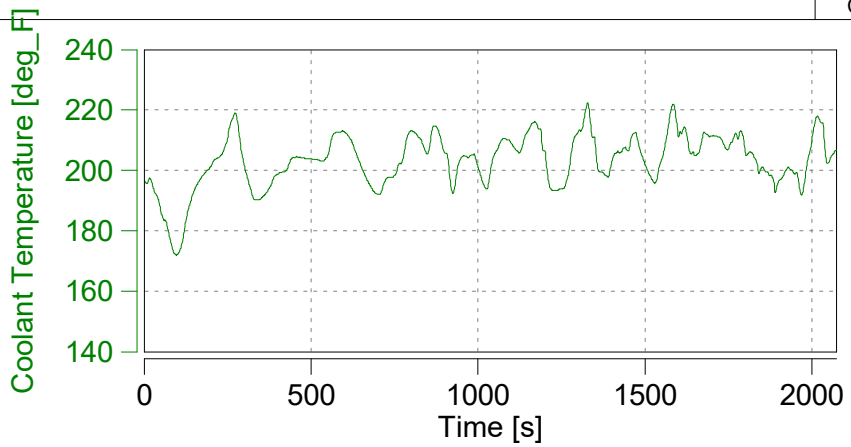
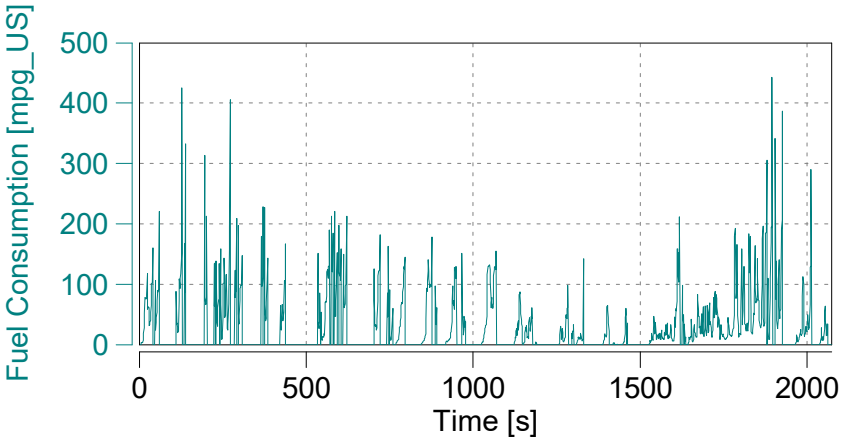
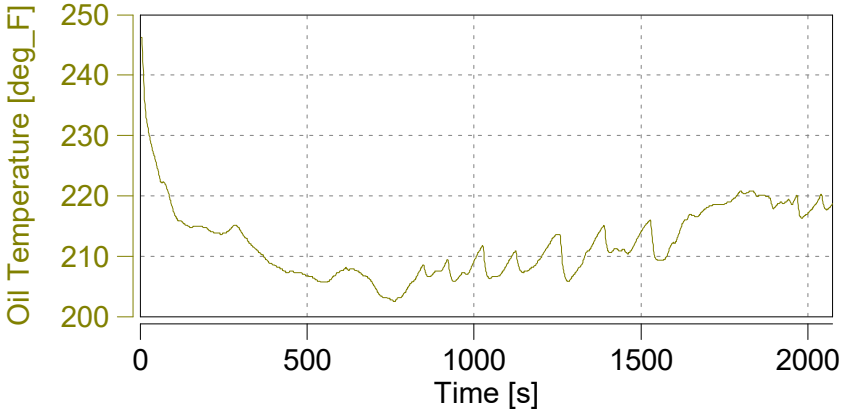








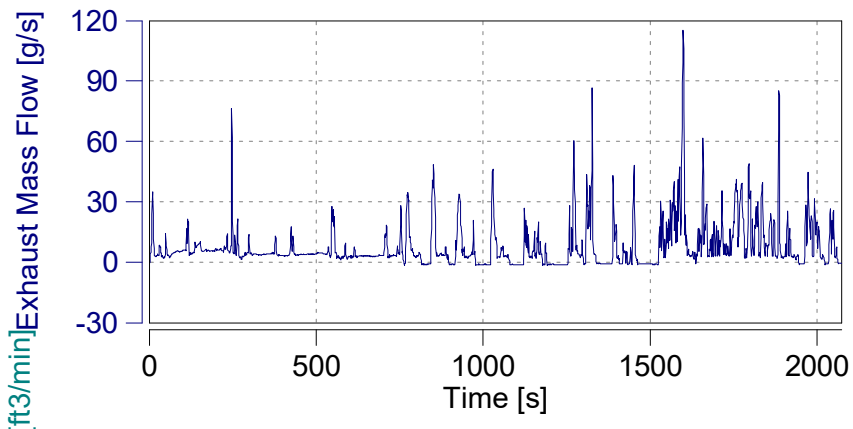
Concerto Version: 505 Build 171, Serial Number: 1604
M.O.V.E Post-Processing: DT_1R4.1_B340
Legislation:

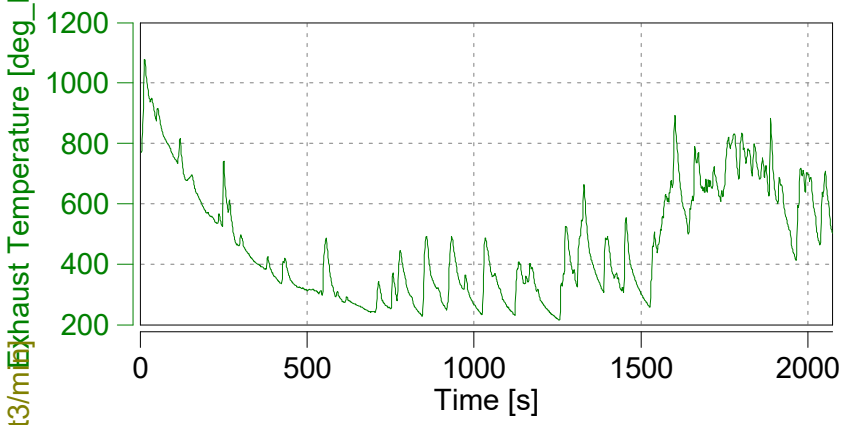
Vehicle: 213-20667 /
Engine: /
NOx Ambient Condition Corr.: 7 - CFR40 §1065.670
Dry / Wet Corr.: 2 - CFR40 §86.1342-90

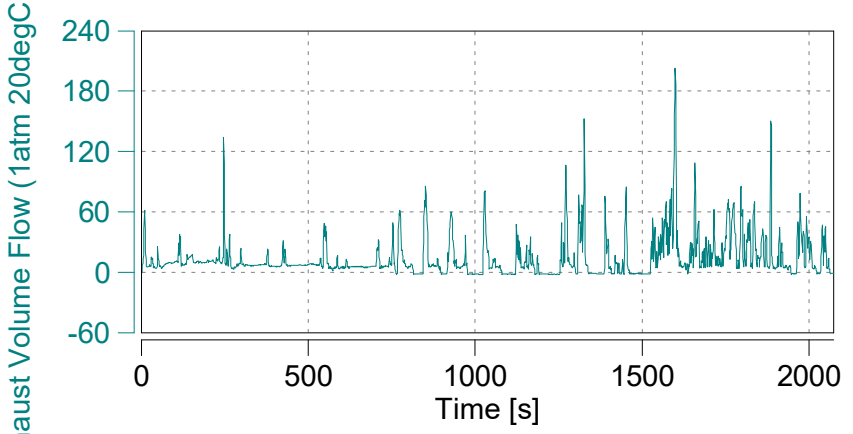
Case: 213-20667
Page: Exhaust Flow (1)

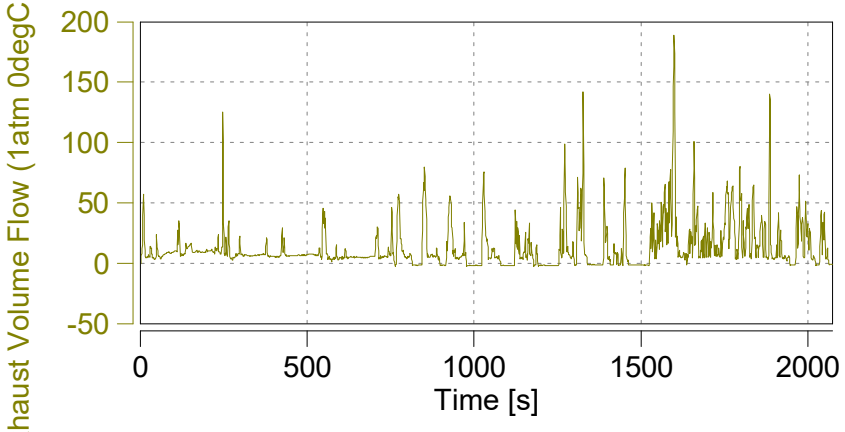
'213-20667 B1 Downhill'
Start Date: 04/14/2022
Start Time: 10:01:13.0

AVL
Concerto M.O.V.E, 2019









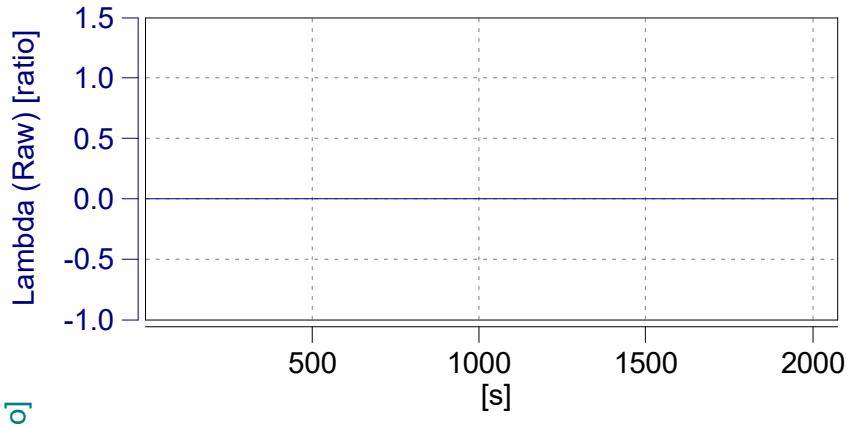
Concerto Version: 505 Build 171, Serial Number: 1604
M.O.V.E Post-Processing: DT_1R4.1_B340
Legislation:

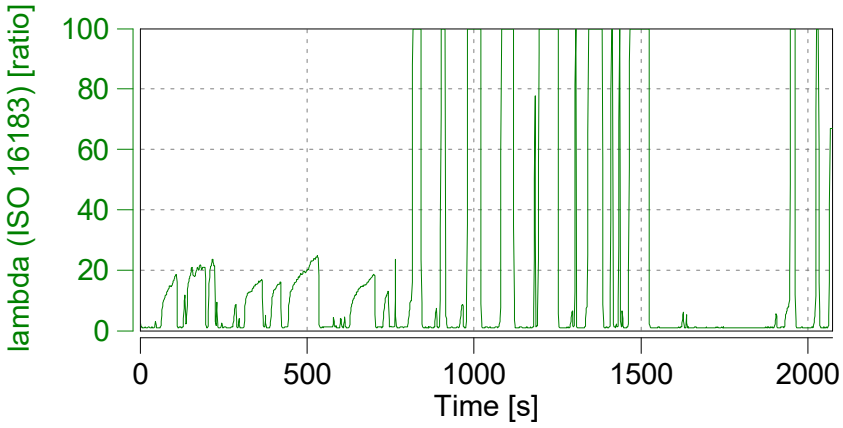
Vehicle: 213-20667 /
Engine: /
NOx Ambient Condition Corr.: 7 - CFR40 §1065.670
Dry / Wet Corr.: 2 - CFR40 §86.1342-90

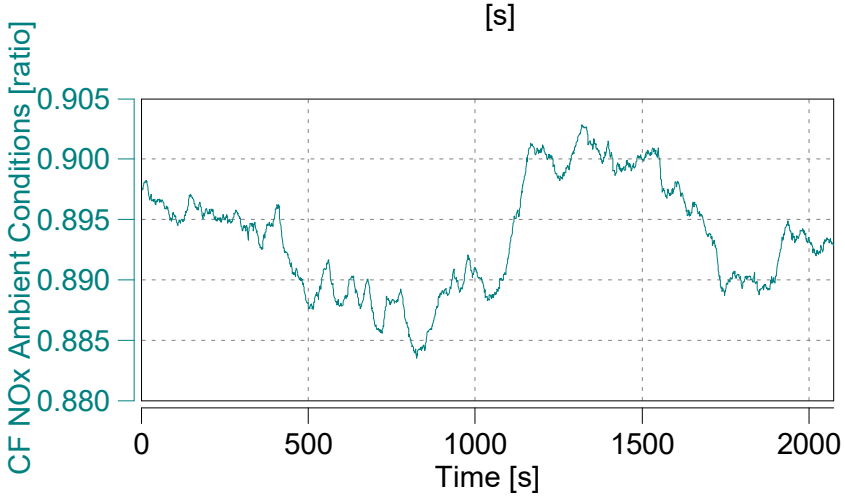
Case: 213-20667
Page: Exhaust Flow (2)

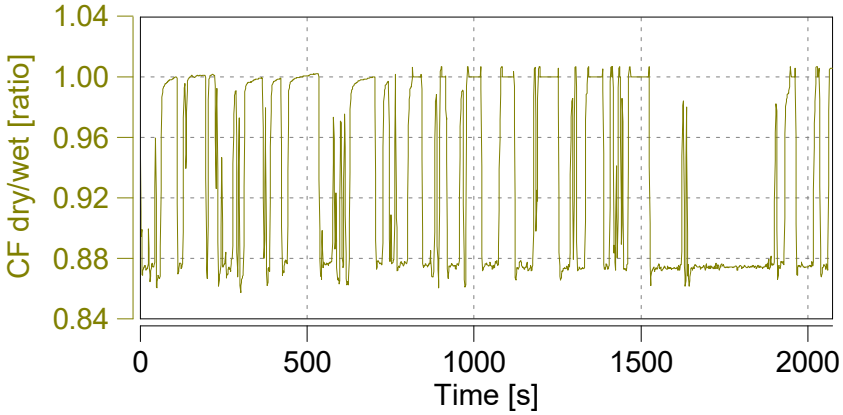
'213-20667 B1 Downhill'
Start Date: 04/14/2022
Start Time: 10:01:13.0

AVL
Concerto M.O.V.E, 2019









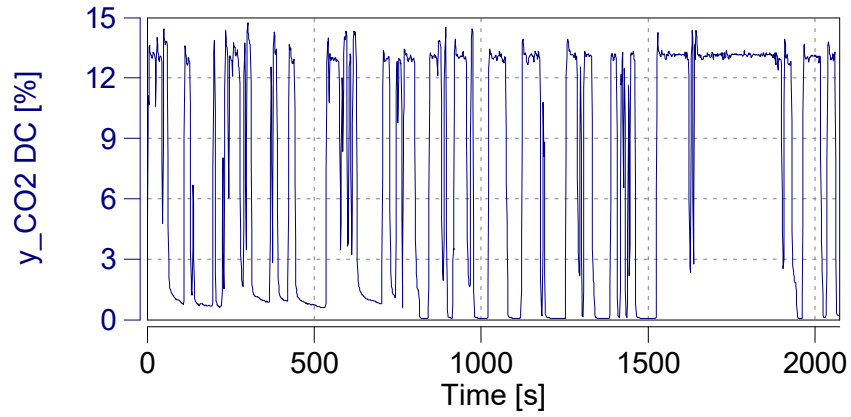
Concerto Version: 505 Build 171, Serial Number: 1604
M.O.V.E Post-Processing: DT_1R4.1_B340
Legislation:

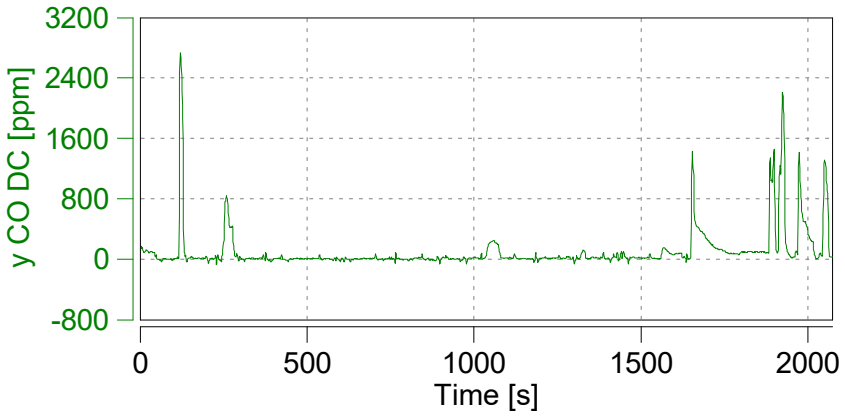
Vehicle: 213-20667 /
Engine: /
NOx Ambient Condition Corr.: 7 - CFR40 §1065.670
Dry / Wet Corr.: 2 - CFR40 §86.1342-90

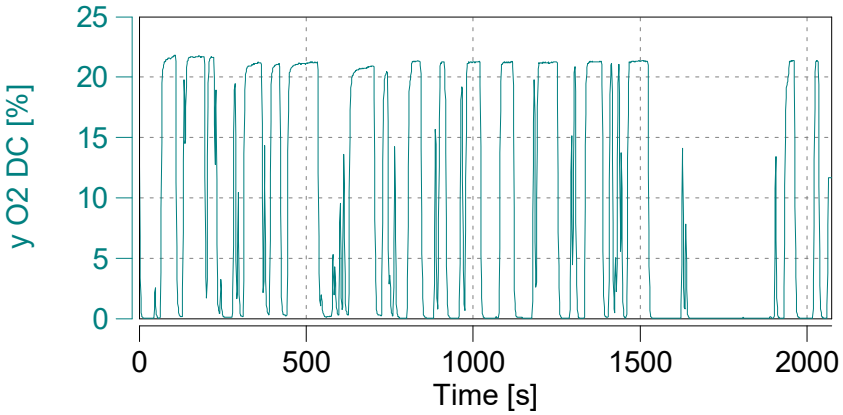
Case: 213-20667
Page: Corrected Emissions (1)

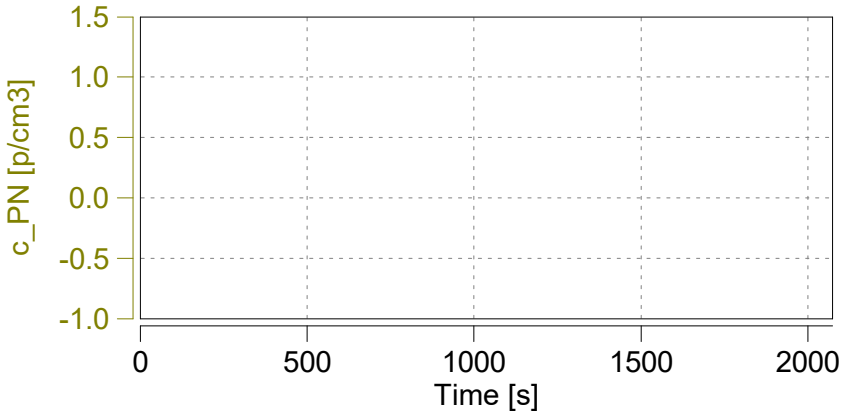
'213-20667 B1 Downhill'
Start Date: 04/14/2022
Start Time: 10:01:13.0

AVL
Concerto M.O.V.E, 2019









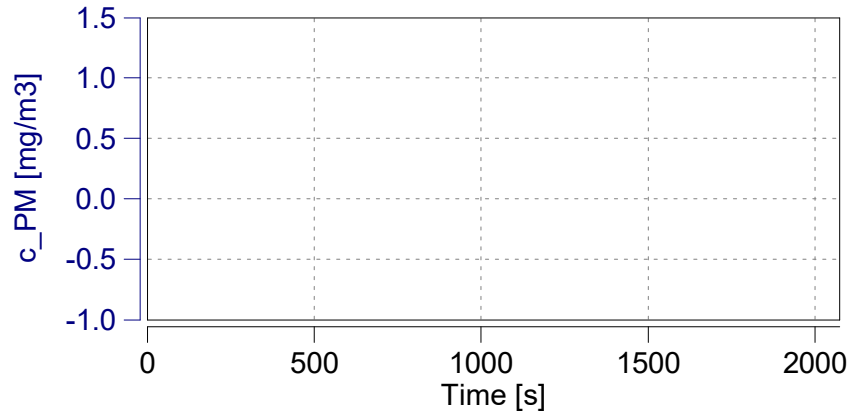
Concerto Version: 505 Build 171, Serial Number: 1604
M.O.V.E Post-Processing: DT_1R4.1_B340
Legislation:

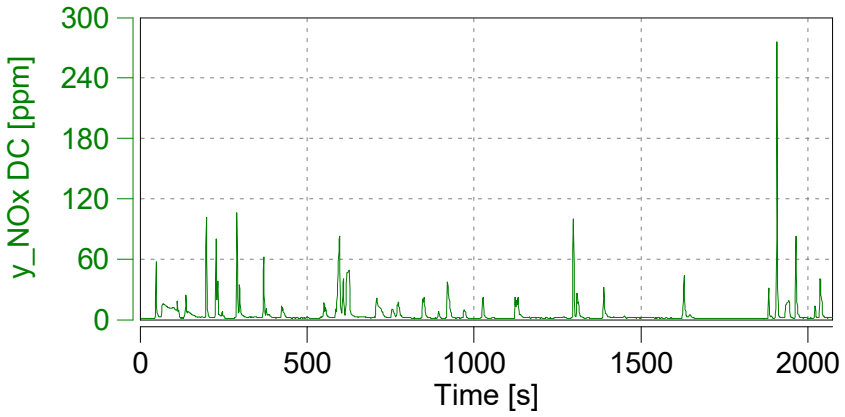
Vehicle: 213-20667 /
Engine: /
NOx Ambient Condition Corr.: 7 - CFR40 §1065.670
Dry / Wet Corr.: 2 - CFR40 §86.1342-90

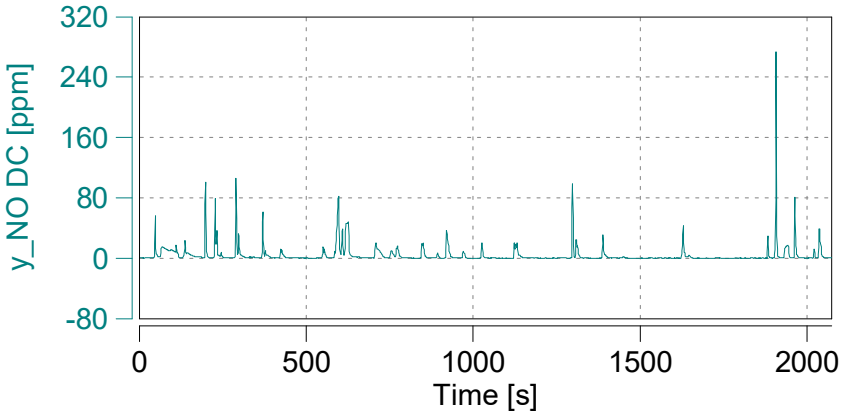
Case: 213-20667
Page: Corrected Emissions (2)

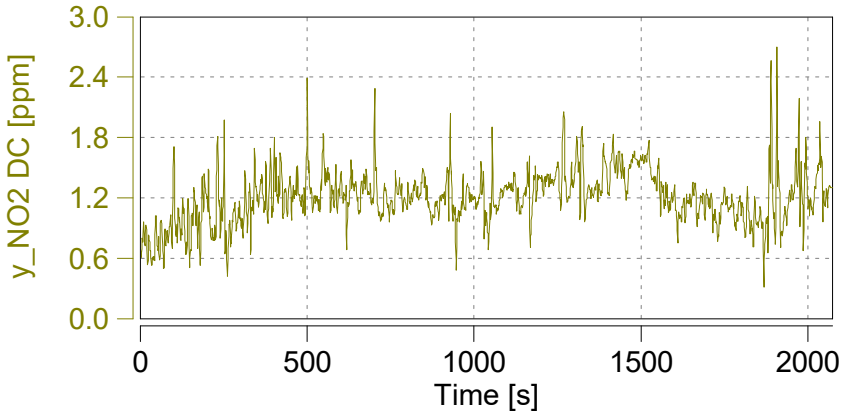
'213-20667 B1 Downhill'
Start Date: 04/14/2022
Start Time: 10:01:13.0

AVL
Concerto M.O.V.E, 2019









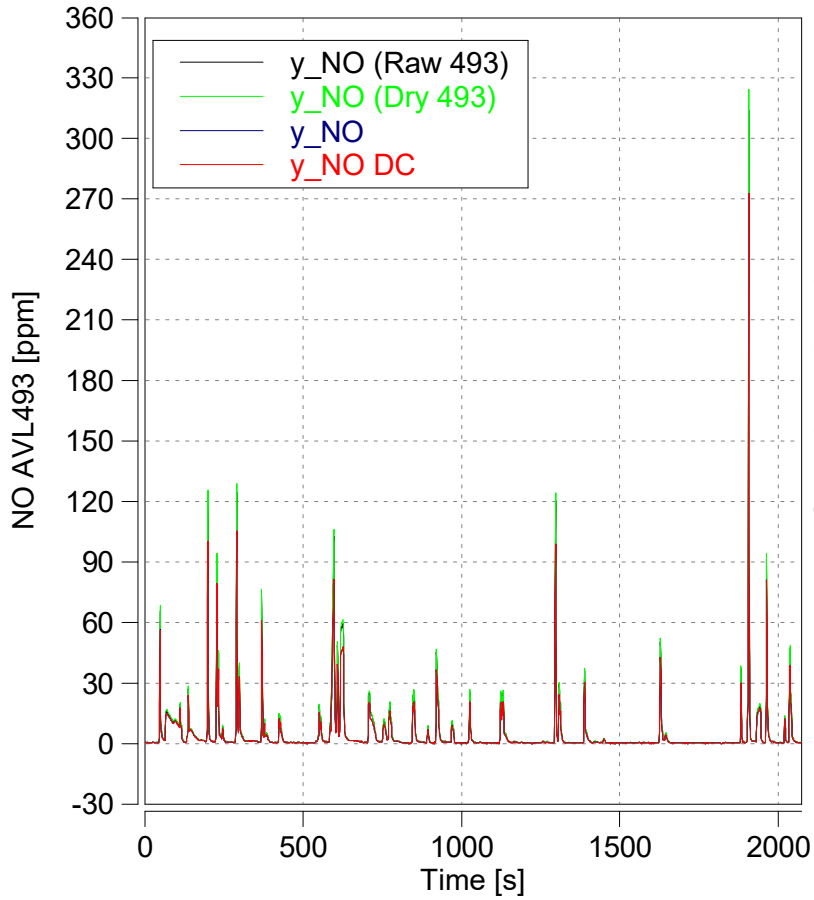
Concerto Version: 505 Build 171, Serial Number: 1604
M.O.V.E Post-Processing: DT_1R4.1_B340
Legislation:

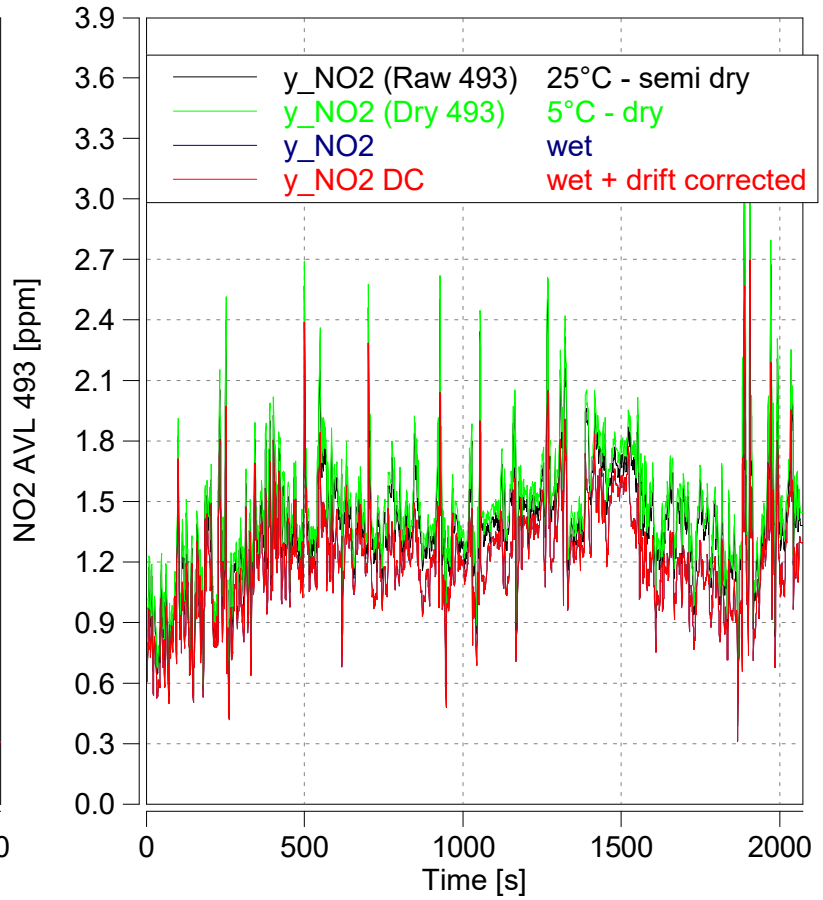
Vehicle: 213-20667 /
Engine: /
NOx Ambient Condition Corr.: 7 - CFR40 §1065.670
Dry / Wet Corr.: 2 - CFR40 §86.1342-90

Case: 213-20667
Page: Corrected Emissions (3)

'213-20667 B1 Downhill'
Start Date: 04/14/2022
Start Time: 10:01:13.0

AVL
Concerto M.O.V.E, 2019





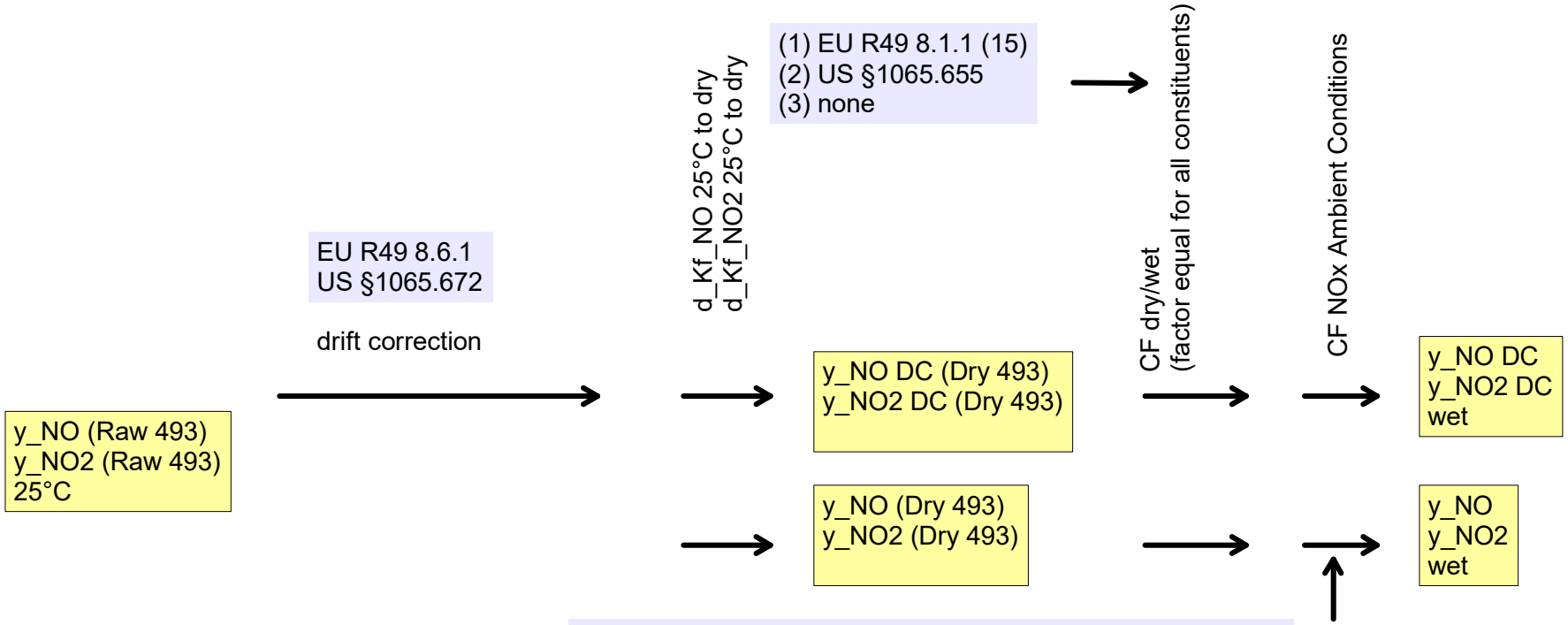
Concerto Version: 505 Build 171, Serial Number: 1604
M.O.V.E Post-Processing: DT_1R4.1_B340
Legislation:

Vehicle: 213-20667 /
Engine: /
NOx Ambient Condition Corr.: 7 - CFR40 §1065.670
Dry / Wet Corr.: 2 - CFR40 §86.1342-90

'213-20667 B1 Downhill'
Start Date: 04/14/2022
Start Time: 10:01:13.0

AVL
Concerto M.O.V.E, 2019

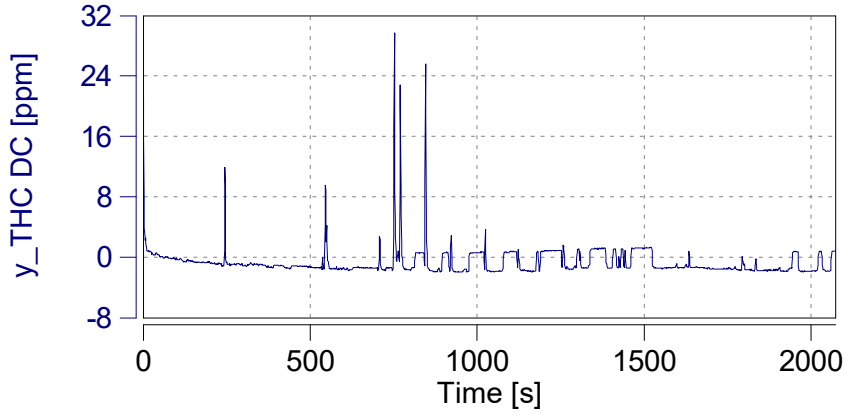
NOx - AVL 493

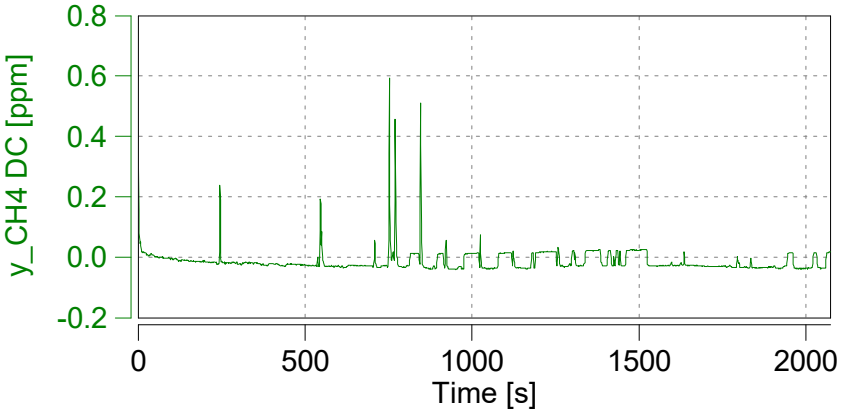


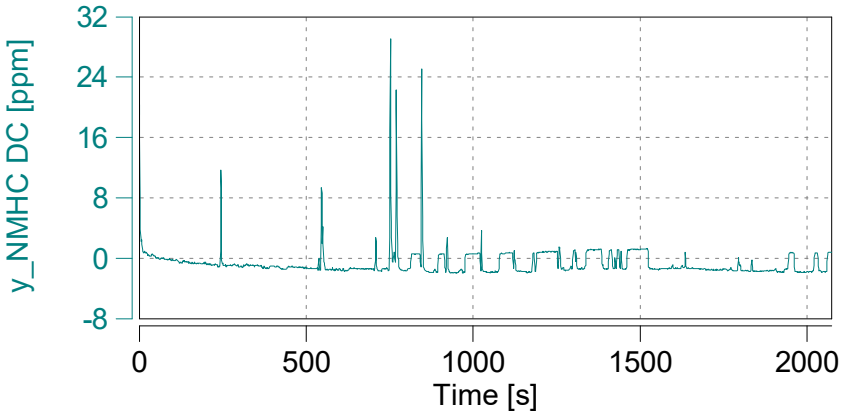
Case: 213-20667
Page: Corrected Emissions (5)

'213-20667 B1 Downhill'
Start Date: 04/14/2022
Start Time: 10:01:13.0

AVL
Concerto M.O.V.E, 2019







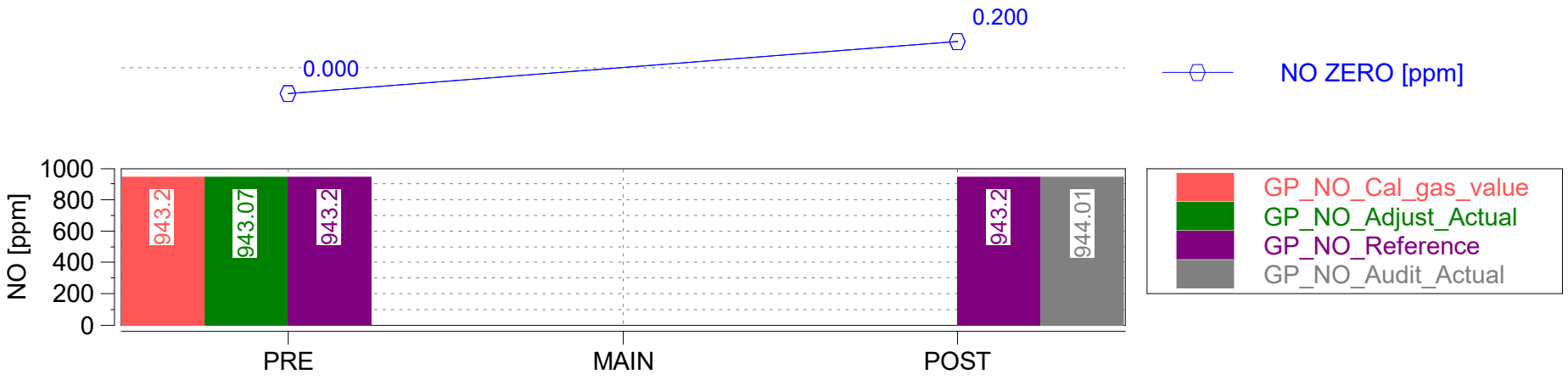
Concerto Version: 505 Build 171, Serial Number: 1604
M.O.V.E Post-Processing: DT_1R4.1_B340
Legislation:

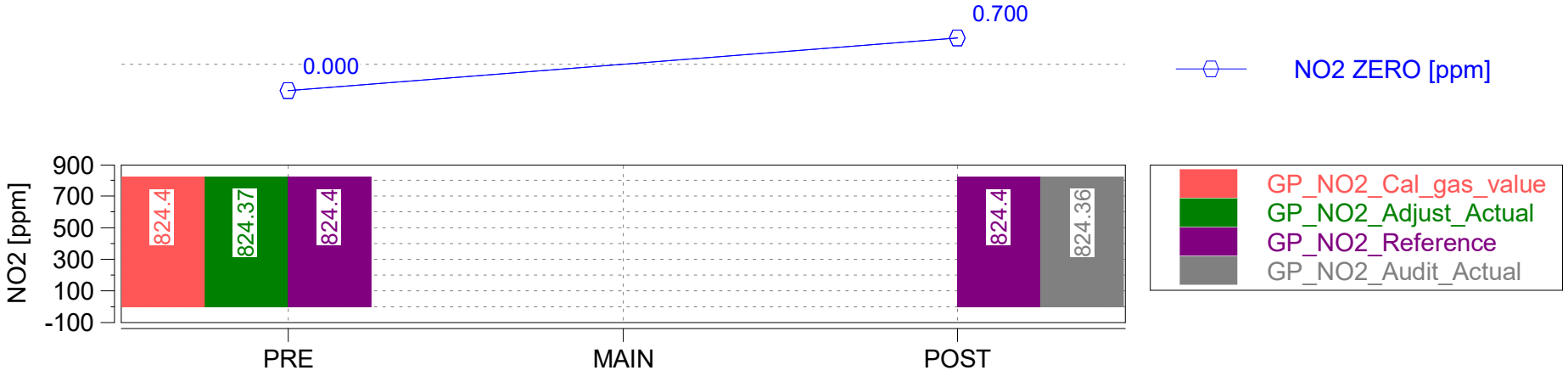
Vehicle: 213-20667 /
Engine: /
NOx Ambient Condition Corr.: 7 - CFR40 §1065.670
Dry / Wet Corr.: 2 - CFR40 §86.1342-90

Case: 213-20667
Page: NO/NO2/NOx Zero - Span

'213-20667 B1 Downhill'
Start Date: 04/14/2022
Start Time: 10:01:13.0

AVL
Concerto M.O.V.E, 2019





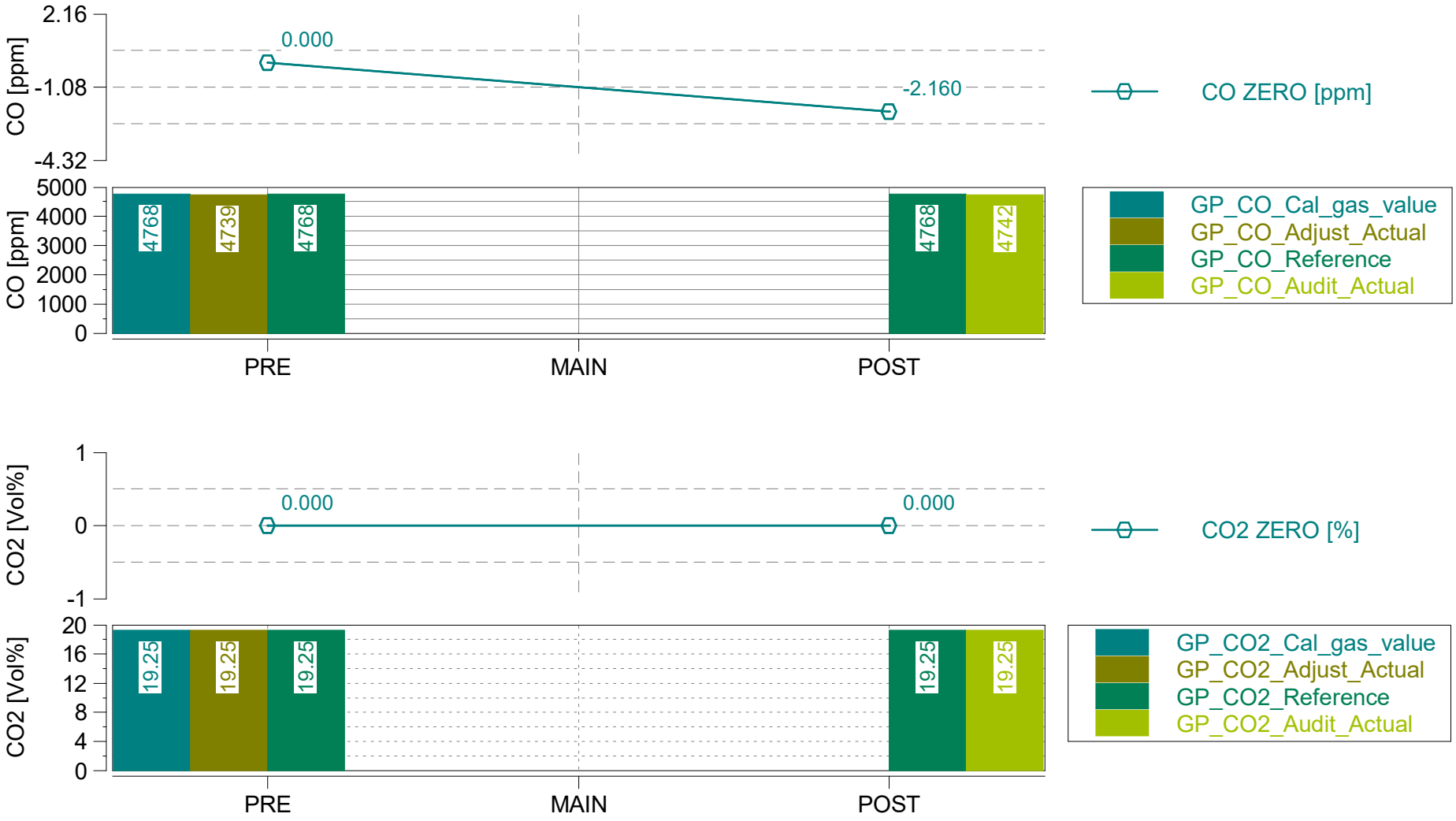
Concerto Version: 505 Build 171, Serial Number: 1604
M.O.V.E Post-Processing: DT_1R4.1_B340
Legislation:

Vehicle: 213-20667 /
Engine: /
NOx Ambient Condition Corr.: 7 - CFR40 §1065.670
Dry / Wet Corr.: 2 - CFR40 §86.1342-90

Case: 213-20667
Page: CO/CO2 Zero - Span

'213-20667 B1 Downhill'
Start Date: 04/14/2022
Start Time: 10:01:13.0

AVL
Concerto M.O.V.E, 2019



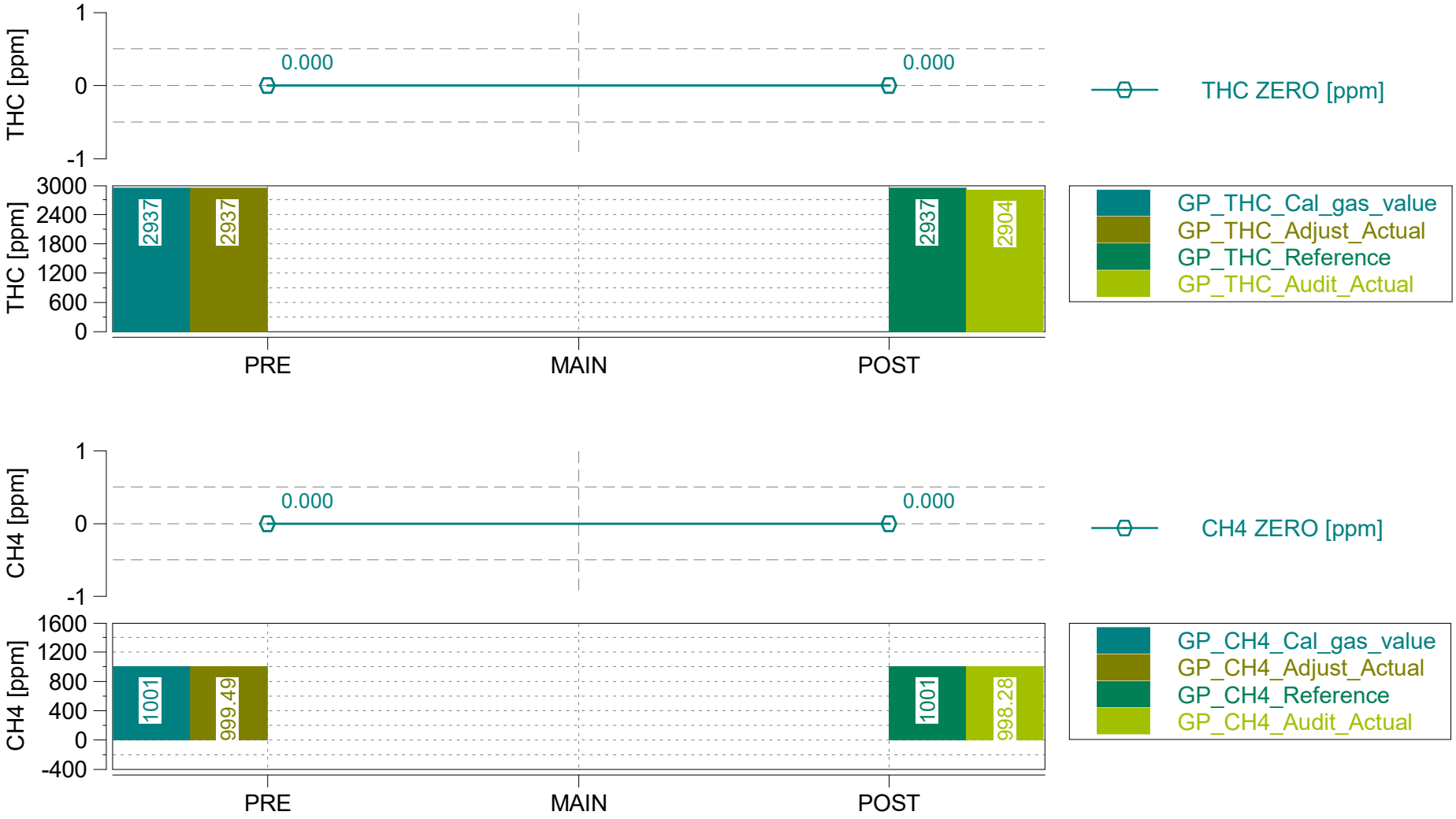
Concerto Version: 505 Build 171, Serial Number: 1604
M.O.V.E Post-Processing: DT_1R4.1_B340
Legislation:

Vehicle: 213-20667 /
Engine: /
NOx Ambient Condition Corr.: 7 - CFR40 §1065.670
Dry / Wet Corr.: 2 - CFR40 §86.1342-90

Case: 213-20667
Page: THC/CH4 Zero - Span

'213-20667 B1 Downhill'
Start Date: 04/14/2022
Start Time: 10:01:13.0

AVL
Concerto M.O.V.E, 2019



Concerto Version: 505 Build 171, Serial Number: 1604
M.O.V.E Post-Processing: DT_1R4.1_B340
Legislation:

Vehicle: 213-20667 /
Engine: /
NOx Ambient Condition Corr.: 7 - CFR40 §1065.670
Dry / Wet Corr.: 2 - CFR40 §86.1342-90

§	criterium	condition	value	unit	pass/fail
GAS Leak Check	The leakage rate on the vacuum side shall not exceed 0.5 per cent of the in-use flow rate for the portion of the system being checked.	The leakage rate <= 0.5%	**0.00**	**%**	pass
PN Leak Check	n/a	n/a	**n/a**	**n/a**	n/a
PM Leak Check	n/a	n/a	**n/a**	**n/a**	n/a

GAS PEMS Devices

Device ID	AVL492
Serial Number	0625
Firmware Version	V1.17
Main Test Date	2022-04-14
Leak Check Age [days]	0

Device ID	AVL4925iS
Serial Number	184
Firmware Version	1.22.0.4

EFM

Device ID	AVL495
Serial Number	00826
Serial Number Tube	01080
Firmware Version	V1.16

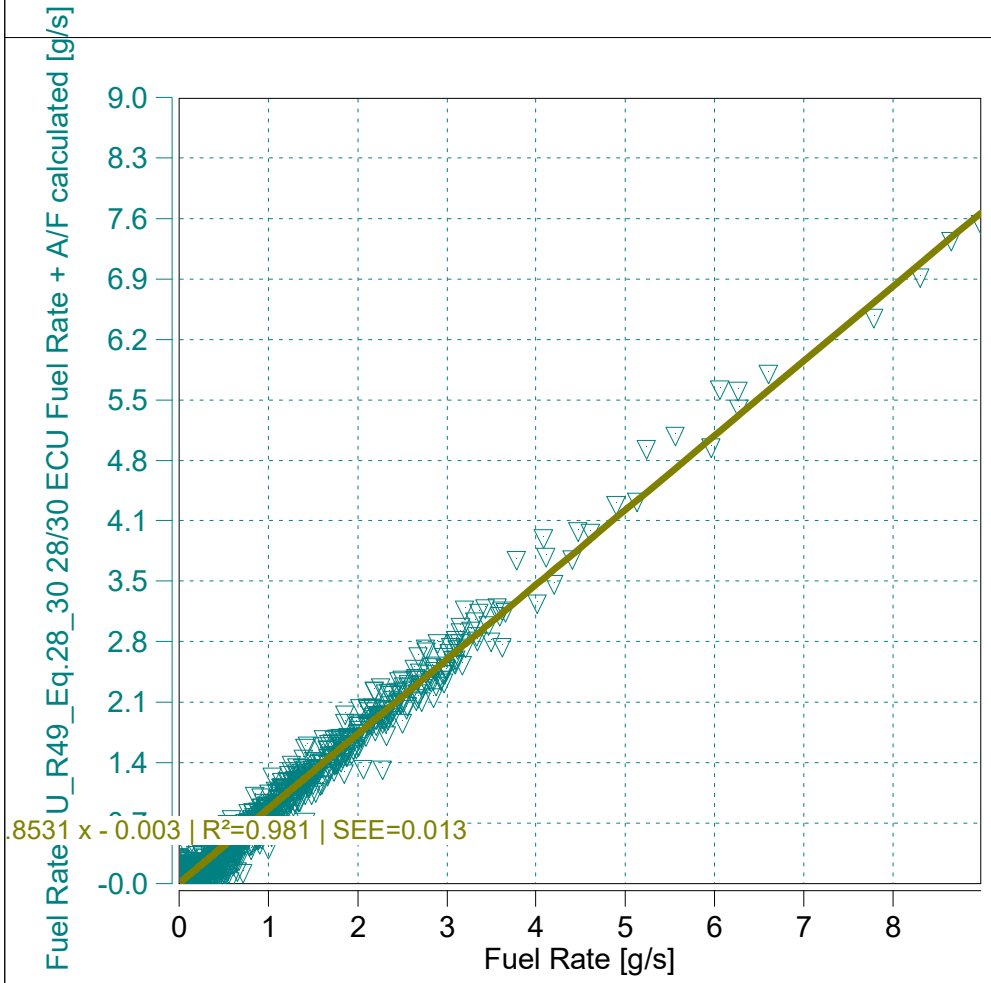
System Control

SC Version	V2.9_237
SC Serial Number	60300923

Case: 213-20667
Page: Fuel Rate ECU vs. Calculated

'213-20667 B1 Downhill'
Start Date: 04/14/2022
Start Time: 10:01:13.0

AVL
Concerto M.O.V.E, 2019



EU 582/2011/Appendix I/3.2.1 | Fuel Rate ECU and calculated

y = 0.8531 x - 0.003 | R²=0.981 | SEE=0.013
m = 0.85 (0.9 - 1.1 recommended)
R² = 0.98 (min 0.9 mandatory)

Data from - to [% of Maximum]

0 100

Concerto Version: 505 Build 171, Serial Number: 1604
M.O.V.E Post-Processing: DT_1R4.1_B340
Legislation:

Vehicle: 213-20667 /
Engine: /
NOx Ambient Condition Corr.: 7 - CFR40 §1065.670
Dry / Wet Corr.: 2 - CFR40 §86.1342-90

Case: 213-20667
Page: Trip Summary

'213-20667_A0 Transfer LATC to CARB'
Start Date: 04/14/2022
Start Time: 10:01:13.0

AVL
Concerto M.O.V.E, 2019

Trip Duration	2013.00	s
Trip Duration (a)	2013.00	s
Trip Distance	24.31	mi
Trip Distance (a)	24.31	mi
Trip Fuel Cons. (b)	2.31	kg
Trip Fuel Cons. (ab)	2.31	kg
Trip Fuel Cons. EU (ac)	1.94	kg
Trip Fuel Cons. US (ac)	1.94	kg
Trip Fuel Economy (b)	29.82	mpg_US
Trip Fuel Economy (ab)	29.82	mpg_US
Trip Fuel Economy EU (ac)	35.44	mpg_US
Trip Fuel Economy US (ac)	35.52	mpg_US
Trip Fuel Economy GGE (b)	29.82	mpg_US
Trip Fuel Economy GGE (ab)	29.82	mpg_US
Trip Fuel Economy EU GGE (ac)	35.44	mpg_US
Trip Fuel Economy US GGE (ac)	35.52	mpg_US
Trip Av. Eng. Speed	1245.71	rpm
Trip Av. Torque	74.29	lbft
Trip Av. Power	20.48	hp
Trip Work		
Trip Work (a)	11.45	hphr
Trip Exhaust Mass	29.54	kg
Trip Exhaust Mass EU (ac)	35.35	kg
Trip Exhaust Mass US (ac)	35.45	kg
Trip Av. Amb. Temperature	71.76	deg_F
Trip Av. Humidity	29.97	%
Trip Av. GPS Altitude	52.64	m
Fuel Type	Petrol (E10)	

ave THC	18.39956	ppm
ave NMHC	18.03157	ppm
ave CH4	0.36799	ppm
ave CO	176.75003	ppm
ave CO2	12.04590	%
ave NOx	2.46046	ppm
ave PM	n/a	mg/m3
ave Soot meas	n/a	mg/m3
ave Soot	n/a	mg/m3
ave PN	n/a	#/cm3
tot THC	0.30932	g
tot NMHC	0.28613	g
tot CH4	0.00686	g
tot CO	5.54663	g
tot CO2	5886.49298	g
tot NO (d)	0.06192	g
tot NO2	0.04698	g
tot NOx	0.10796	g
tot Soot	n/a	g
tot Soot meas	n/a	g
tot PM	n/a	g
tot PN	n/a	#
PM measurement type	0.00000	-
tot Soot on PM filter (estim.)	0.00000	mg
Soot --> PM simple scaling factor	1.00000	-
Trip Av. Veh. Speed	43.47996	mi/hr
Trip Distance Share Urban	12.74119	% distanc
Trip Distance Share Rural	19.95559	% distanc
Trip Distance Share Motorway	67.30322	% distanc

BS CO2	514.06994	g/hphr
BS CO	0.48439	g/hphr
BS THC	0.02701	g/hphr
BS NMHC	0.02499	g/hphr
BS CH4	0.00060	g/hphr
BS NO (d)	0.00541	g/hphr
BS NO2	0.00410	g/hphr
BS NOx	0.00943	g/hphr
BS Soot	n/a	g/hphr
BS Soot meas	n/a	g/hphr
BS PM	n/a	g/hphr
BS PN	n/a	#/hpr
DS CO2	242.11751	g/mi
DS CO	0.22814	g/mi
DS THC	0.01272	g/mi
DS NMHC	0.01177	g/mi
DS CH4	0.00028	g/mi
DS NO (d)	0.00255	g/mi
DS NO2	0.00193	g/mi
DS NOx	0.00444	g/mi
DS Soot	n/a	g/mi
DS Soot meas	n/a	g/mi
DS PM	n/a	g/mi
DS PN	n/a	#/mi
FS CO2	2551.93096	g/kg
FS CO	2.40459	g/kg
FS THC	0.13410	g/kg
FS NMHC	0.12404	g/kg
FS CH4	0.00297	g/kg
FS NO (d)	0.02685	g/kg
FS NO2	0.02037	g/kg
FS NOx	0.04680	g/kg
FS Soot	n/a	g/kg
FS Soot meas	n/a	g/kg
FS PM	n/a	g/kg
FS PN	n/a	#/kg

(a) GAS PEMS measurement state only, (b) based on fuel rate input (ECU, Fuel Meter), (c) Based on A/F ratio (eq 28-32 - R49)
(d) NO calculated using molecular weight of NO2, GGE=Gasoline Gallon Equivalents

Concerto Version: 505 Build 171, Serial Number: 1604
M.O.V.E Post-Processing: DT_1R4.1_B340
Legislation:

Vehicle: 213-20667 /
Engine: /
NOx Ambient Condition Corr.: 7 - CFR40 §1065.670
Dry / Wet Corr.: 2 - CFR40 §86.1342-90

Case: 213-20667
Page: Trip Summary Drift Corrected

'213-20667_A0 Transfer LATC to CARB'
Start Date: 04/14/2022
Start Time: 10:01:13.0

AVL
Concerto M.O.V.E, 2019

Trip Duration	2013.00	s
Trip Duration (a)	2013.00	s
Trip Distance	24.31	mi
Trip Distance (a)	24.31	mi
Trip Fuel Cons. (b)	2.31	kg
Trip Fuel Cons. (ab)	2.31	kg
Trip Fuel Cons. EU (ac)	1.94	kg
Trip Fuel Cons. US (ac)	1.94	kg
Trip Fuel Economy (b)	29.82	mpg_US
Trip Fuel Economy (ab)	29.82	mpg_US
Trip Fuel Economy EU (ac)	35.44	mpg_US
Trip Fuel Economy US (ac)	35.52	mpg_US
Trip Fuel Economy GGE (b)	29.82	mpg_US
Trip Fuel Economy GGE (ab)	29.82	mpg_US
Trip Fuel Economy EU GGE (ac)	35.44	mpg_US
Trip Fuel Economy US GGE (ac)	35.52	mpg_US
Trip Av. Eng. Speed	1245.71	rpm
Trip Av. Torque	74.29	lbft
Trip Av. Power	20.48	hp
Trip Work		
Trip Work (a)	11.45	hphr
Trip Exhaust Mass	29.54	kg
Trip Exhaust Mass EU (ac)	35.35	kg
Trip Exhaust Mass US (ac)	35.45	kg
Trip Av. Amb. Temperature	71.76	deg_F
Trip Av. Humidity	29.97	%
Trip Av. GPS Altitude	52.64	m
Fuel Type	Petrol (E10)	

ave THC DC	18.50504	ppm
ave NMHC DC	18.13494	ppm
ave CH4 DC	0.37010	ppm
ave CO DC	177.75831	ppm
ave CO2 DC	12.04590	%
ave NOx DC	2.45996	ppm
ave PM	n/a	mg/m3
ave Soot meas	n/a	mg/m3
ave Soot	n/a	mg/m3
ave PN DC		
tot THC DC	0.31110	g
tot NMHC DC	0.28777	g
tot CH4 DC	0.00690	g
tot CO DC	5.57828	g
tot CO2 DC	5886.49298	g
tot NO DC (d)	0.06190	g
tot NO2 DC	0.04698	g
tot NOx DC	0.10794	g
tot Soot	n/a	g
tot Soot meas	n/a	g
tot PM	n/a	g
tot PN DC		
PM measurement type	0.00000	-
tot Soot on PM filter (estim.)	0.00000	mg
Soot --> PM simple scaling factor	1.00000	-
Trip Av. Veh. Speed	43.47996	mi/hr
Trip Distance Share Urban	12.74119	% distanc
Trip Distance Share Rural	19.95559	% distanc
Trip Distance Share Motorway	67.30322	% distanc

BS CO2 DC	514.06994	g/hphr
BS CO DC	0.48715	g/hphr
BS THC DC	0.02717	g/hphr
BS NMHC DC	0.02513	g/hphr
BS CH4 DC	0.00060	g/hphr
BS NO DC (d)	0.00541	g/hphr
BS NO2 DC	0.00410	g/hphr
BS NOx DC	0.00943	g/hphr
BS Soot	n/a	g/hphr
BS Soot meas	n/a	g/hphr
BS PM	n/a	g/hphr
BS PN DC		
DS CO2 DC	242.11751	g/mi
DS CO DC	0.22944	g/mi
DS THC DC	0.01280	g/mi
DS NMHC DC	0.01184	g/mi
DS CH4 DC	0.00028	g/mi
DS NO DC (d)	0.00255	g/mi
DS NO2 DC	0.00193	g/mi
DS NOx DC	0.00444	g/mi
DS Soot	n/a	g/mi
DS Soot meas	n/a	g/mi
DS PM	n/a	g/mi
DS PN DC		
FS CO2 DC	2551.93096	g/kg
FS CO DC	2.41831	g/kg
FS THC DC	0.13487	g/kg
FS NMHC DC	0.12475	g/kg
FS CH4 DC	0.00299	g/kg
FS NO DC (d)	0.02684	g/kg
FS NO2 DC	0.02037	g/kg
FS NOx DC	0.04680	g/kg
FS Soot	n/a	g/kg
FS Soot meas	n/a	g/kg
FS PM	n/a	g/kg
FS PN DC		

(a) GAS PEMS measurement state only, (b) based on fuel rate input (ECU, Fuel Meter), (c) Based on A/F ratio (eq 28-32 - R49)
(d) NO calculated using molecular weight of NO2, GGE=Gasoline Gallon Equivalents

Concerto Version: 505 Build 171, Serial Number: 1604
M.O.V.E Post-Processing: DT_1R4.1_B340
Legislation:

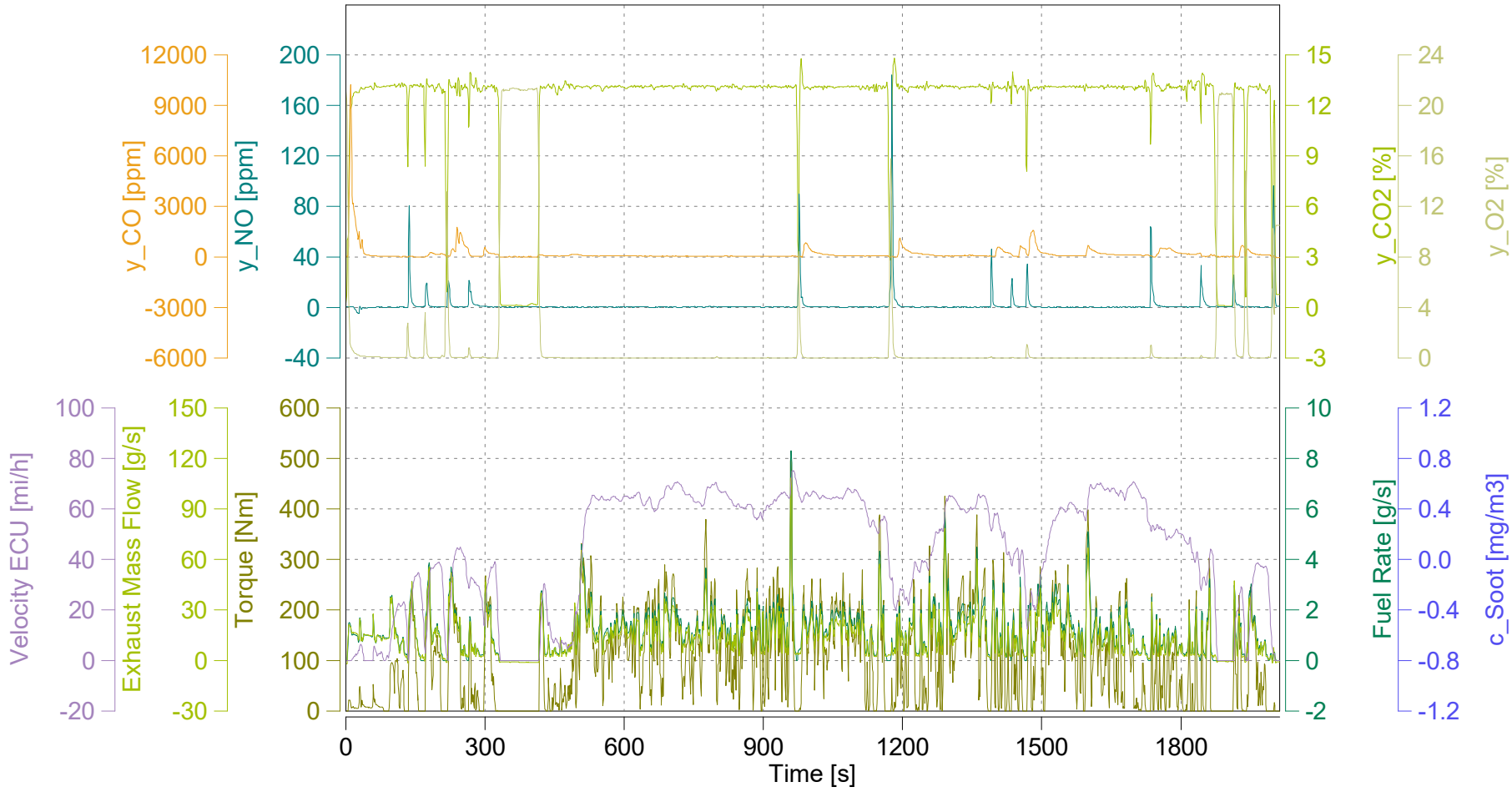
Vehicle: 213-20667 /
Engine: /
NOx Ambient Condition Corr.: 7 - CFR40 §1065.670
Dry / Wet Corr.: 2 - CFR40 §86.1342-90

Case: 213-20667
Page: Time Alignment Check

'213-20667_A0 Transfer LATC to CARB'
Start Date: 04/14/2022
Start Time: 10:01:13.0

AVL

Concerto M.



Absolute Tim

y_THC
y_NO
y_CO2
y_O2
c_Soot
Fuel Rate
Exhaust Mas
Torque
Velocity ECU

AVL 492 De

THC
NO/NO2
CO/CO2
O2

Apply De

Alignment F

Reset Time

Reset A

Apply Cu

Concerto Version: 505 Build 171, Serial Number: 1604
M.O.V.E Post-Processing: DT_1R4.1_B340
Legislation:

Vehicle: 213-20667 /
Engine: /
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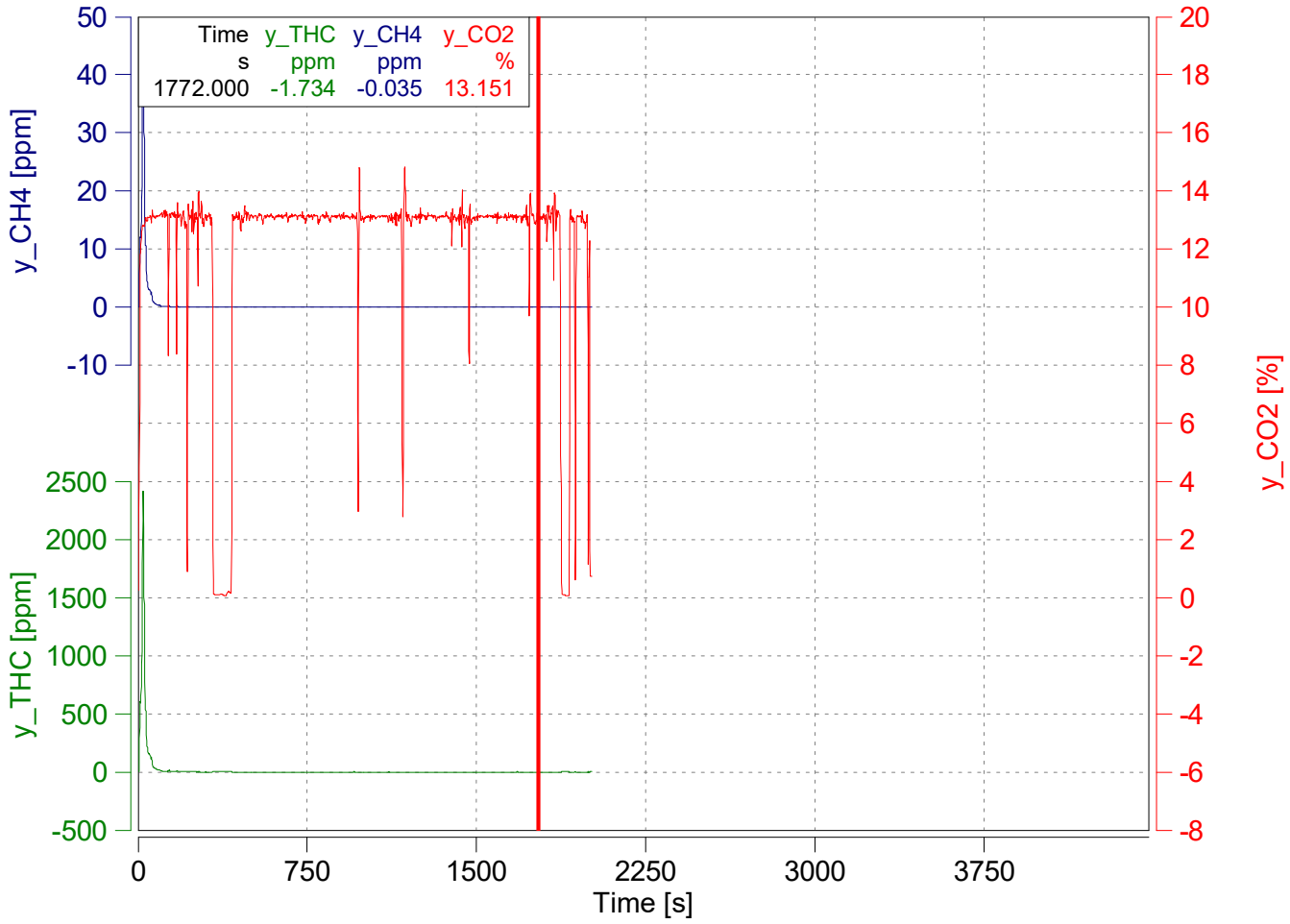
Dry / Wet Corr.: 2 - CFR40 §86.1342-90

Case: 213-20667
Page: Time Alignment of Gas Concentrations

'213-20667_A0 Transfer LATC to CARB'
Start Date: 04/14/2022
Start Time: 10:01:13.0

AVL
Concerto M.O.V.E, 2019



Absolute Time Shifts

y_THC	s	-4.3
y_CH4	s	-6.3

Reset Time Shifts in Plot

Apply Current Values

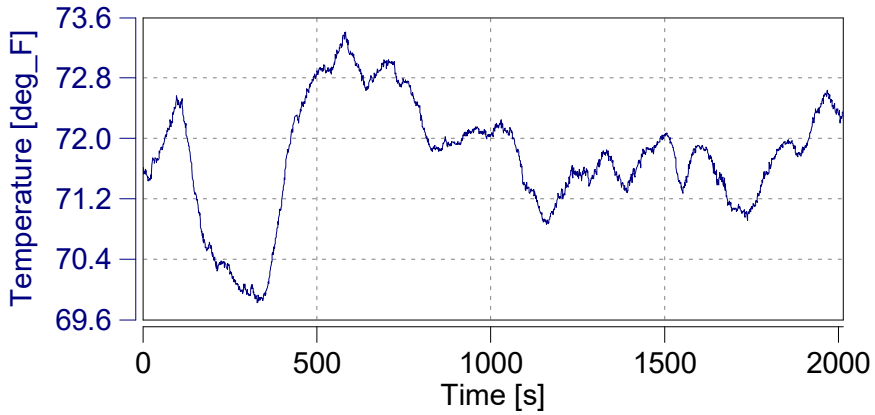
Concerto Version: 505 Build 171, Serial Number: 1604
M.O.V.E Post-Processing: DT_1R4.1_B340
Legislation:

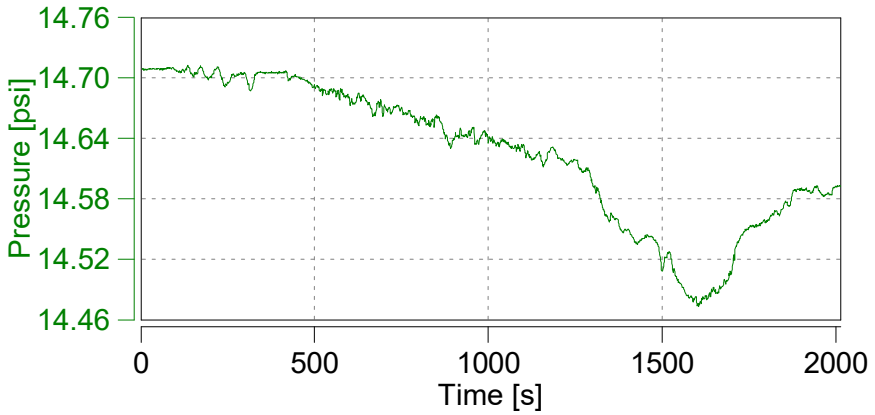
Vehicle: 213-20667 /
Engine: /
NOx Ambient Condition Corr.: 7 - CFR40 §1065.670
Dry / Wet Corr.: 2 - CFR40 §86.1342-90

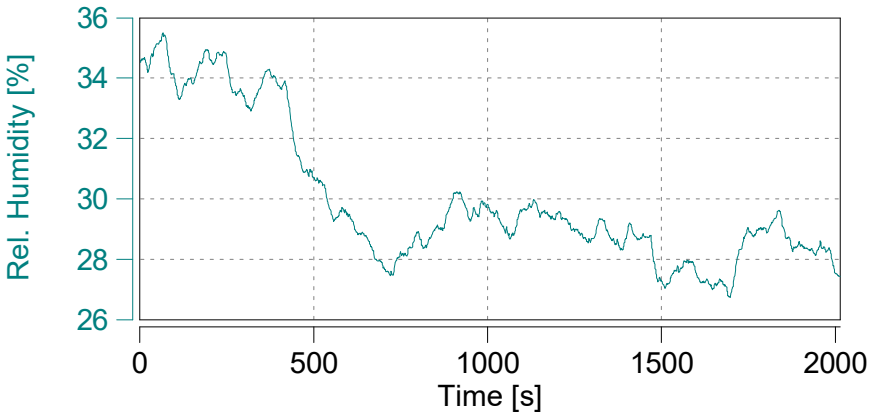
Case: 213-20667
Page: Ambient Conditions

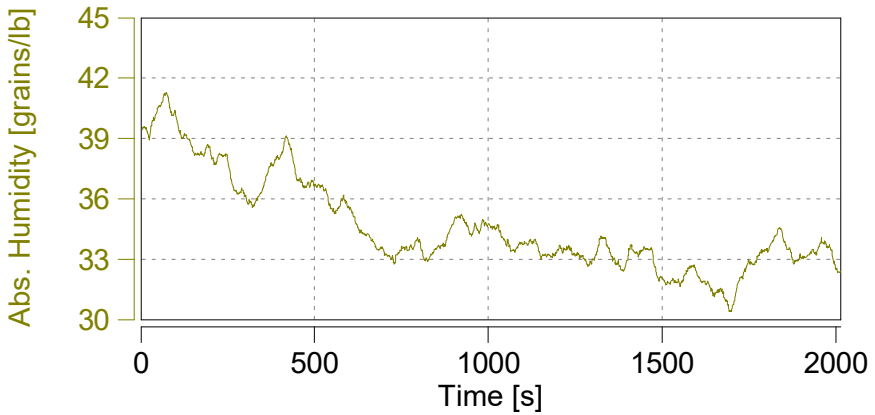
'213-20667_A0 Transfer LATC to CARB'
Start Date: 04/14/2022
Start Time: 10:01:13.0

AVL
Concerto M.O.V.E, 2019









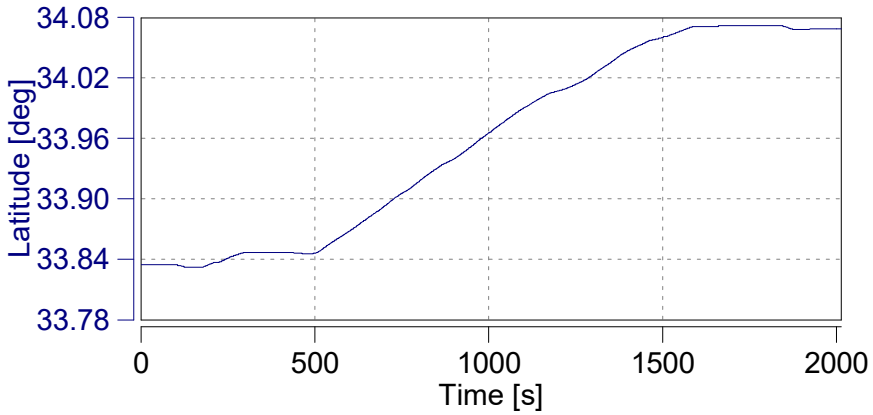
Concerto Version: 505 Build 171, Serial Number: 1604
M.O.V.E Post-Processing: DT_1R4.1_B340
Legislation:

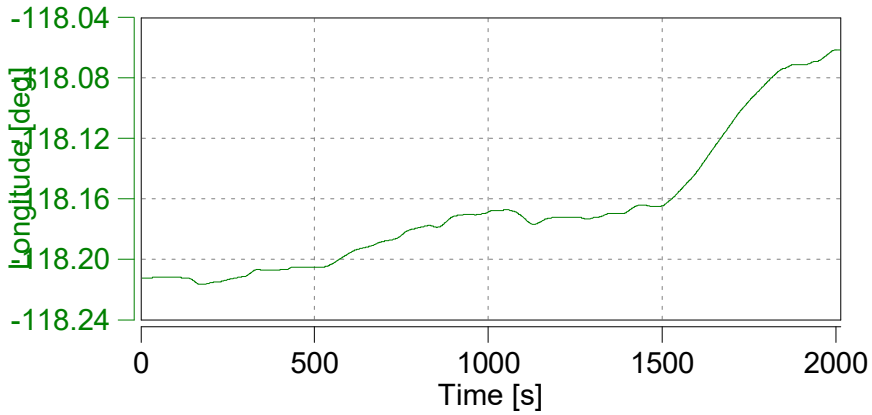
Vehicle: 213-20667 /
Engine: /
NOx Ambient Condition Corr.: 7 - CFR40 §1065.670
Dry / Wet Corr.: 2 - CFR40 §86.1342-90

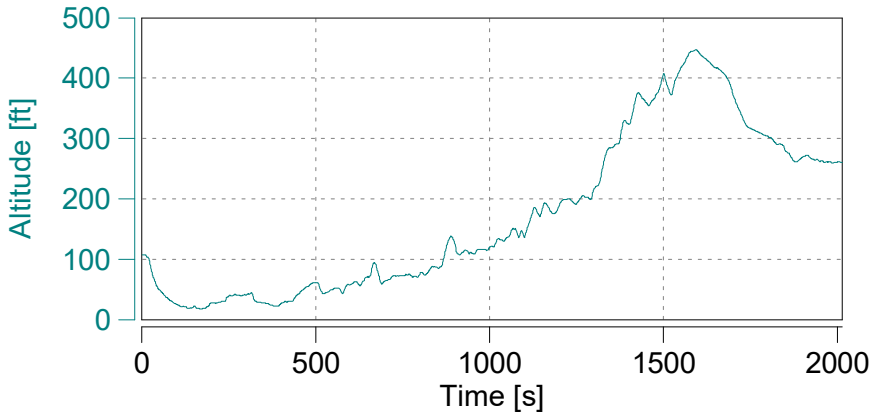
Case: 213-20667
Page: GPS

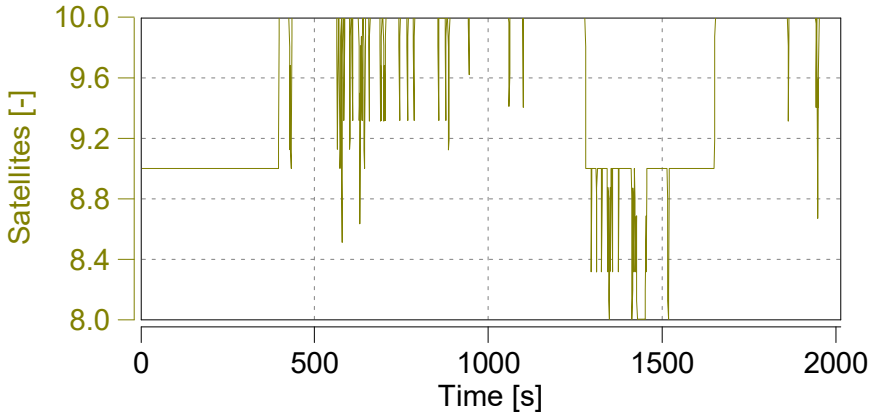
'213-20667_A0 Transfer LATC to CARB'
Start Date: 04/14/2022
Start Time: 10:01:13.0

AVL
Concerto M.O.V.E, 2019









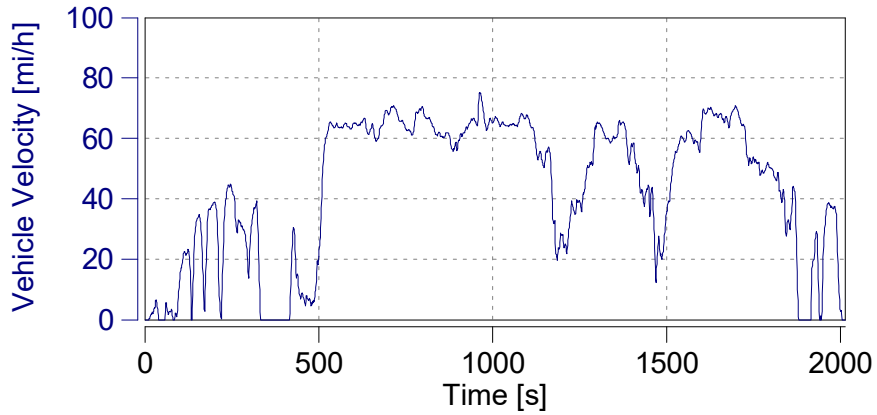
Concerto Version: 505 Build 171, Serial Number: 1604
M.O.V.E Post-Processing: DT_1R4.1_B340
Legislation:

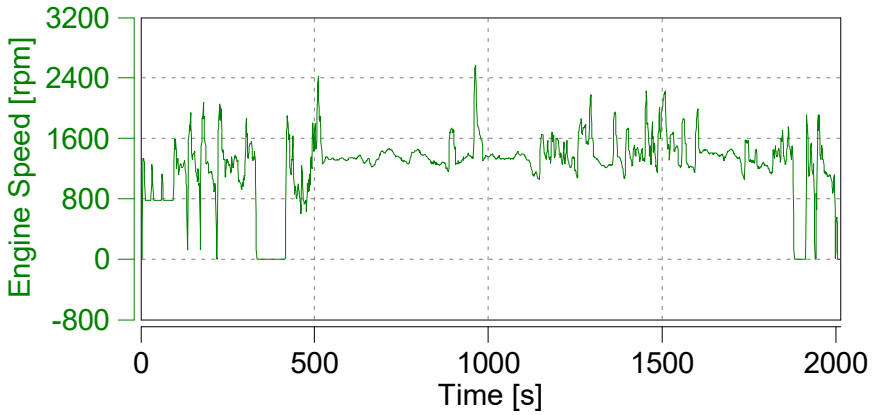
Vehicle: 213-20667 /
Engine: /
NOx Ambient Condition Corr.: 7 - CFR40 §1065.670
Dry / Wet Corr.: 2 - CFR40 §86.1342-90

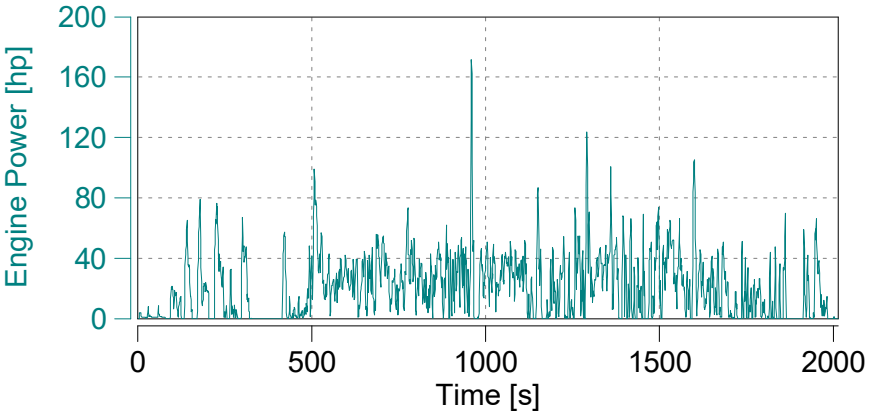
Case: 213-20667
Page: Engine (1)

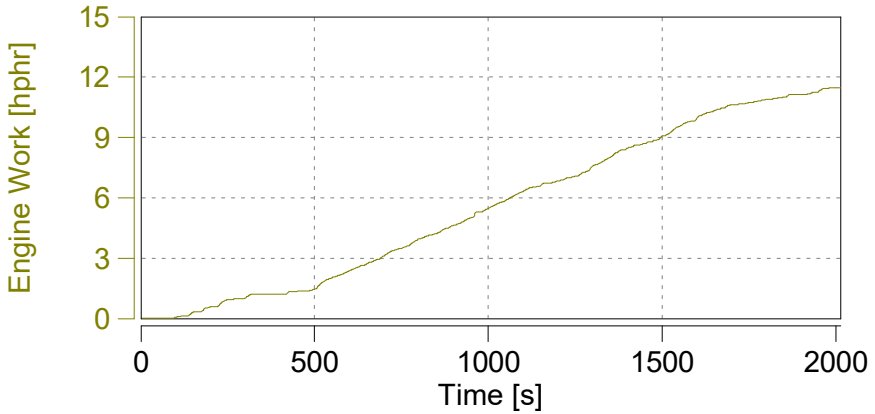
'213-20667_A0 Transfer LATC to CARB'
Start Date: 04/14/2022
Start Time: 10:01:13.0

AVL
Concerto M.O.V.E, 2019









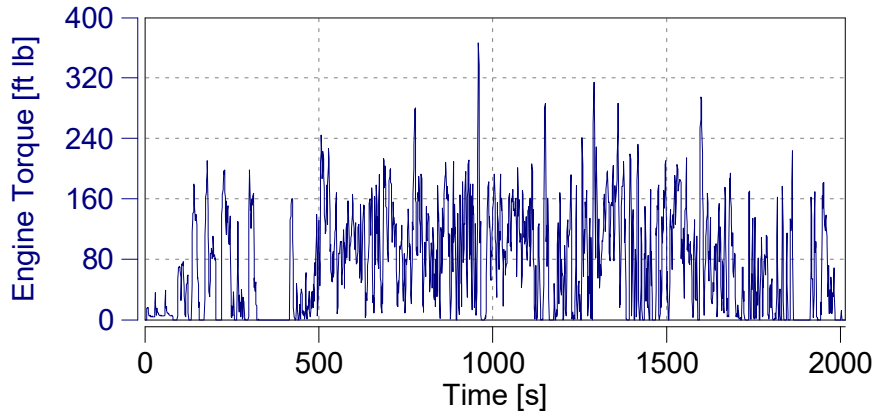
Concerto Version: 505 Build 171, Serial Number: 1604
M.O.V.E Post-Processing: DT_1R4.1_B340
Legislation:

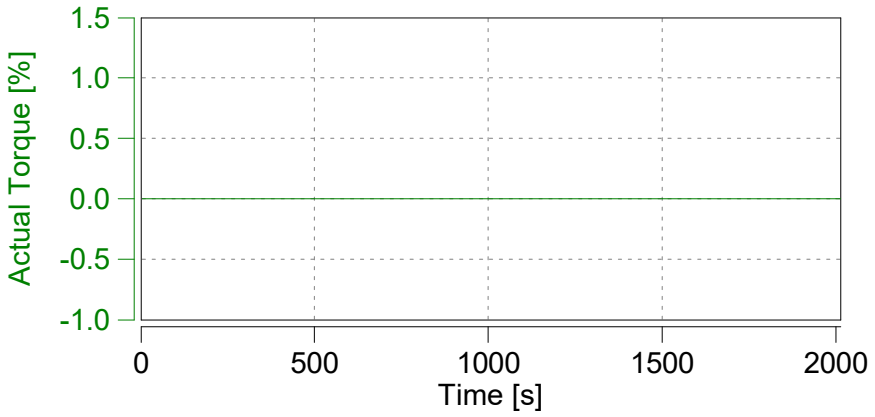
Vehicle: 213-20667 /
Engine: /
NOx Ambient Condition Corr.: 7 - CFR40 §1065.670
Dry / Wet Corr.: 2 - CFR40 §86.1342-90

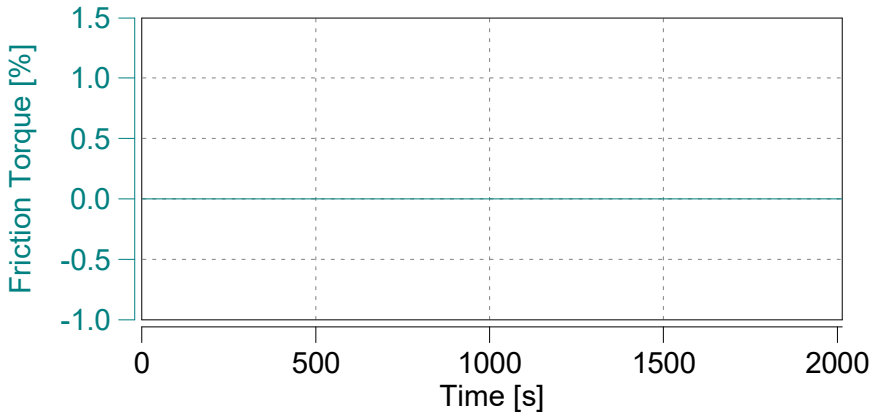
Case: 213-20667
Page: Engine (2)

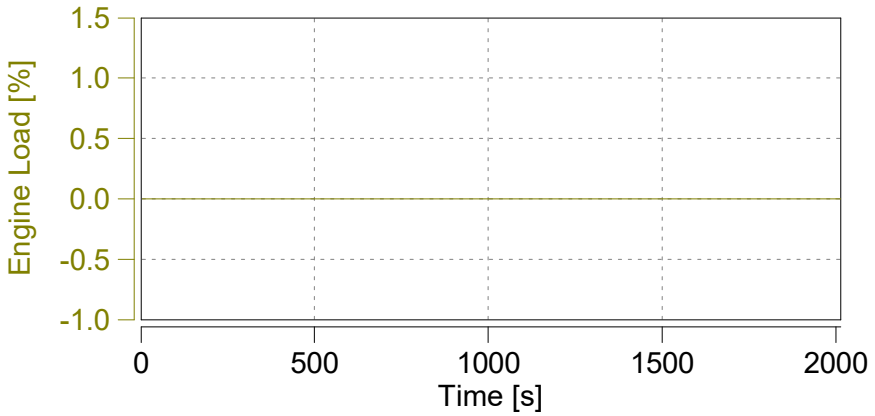
'213-20667_A0 Transfer LATC to CARB'
Start Date: 04/14/2022
Start Time: 10:01:13.0

AVL
Concerto M.O.V.E, 2019







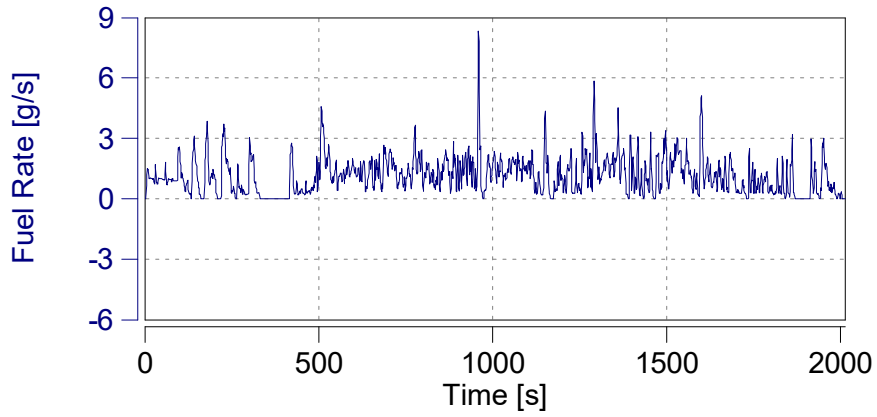


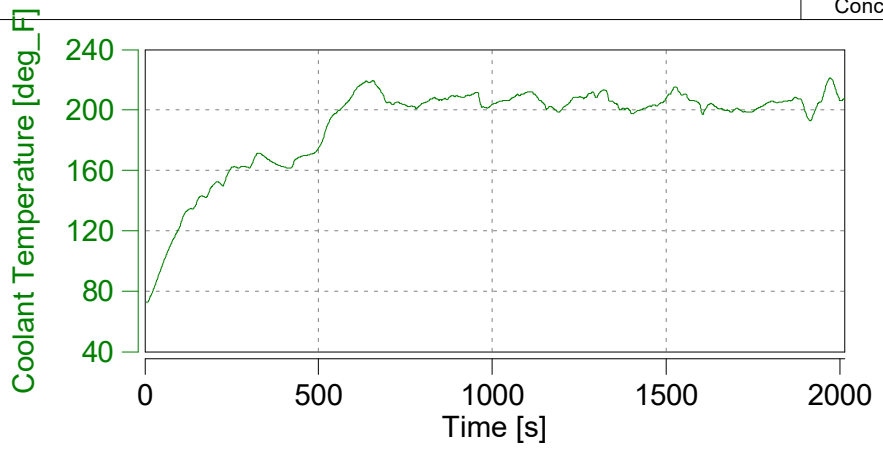
Concerto Version: 505 Build 171, Serial Number: 1604
M.O.V.E Post-Processing: DT_1R4.1_B340
Legislation:

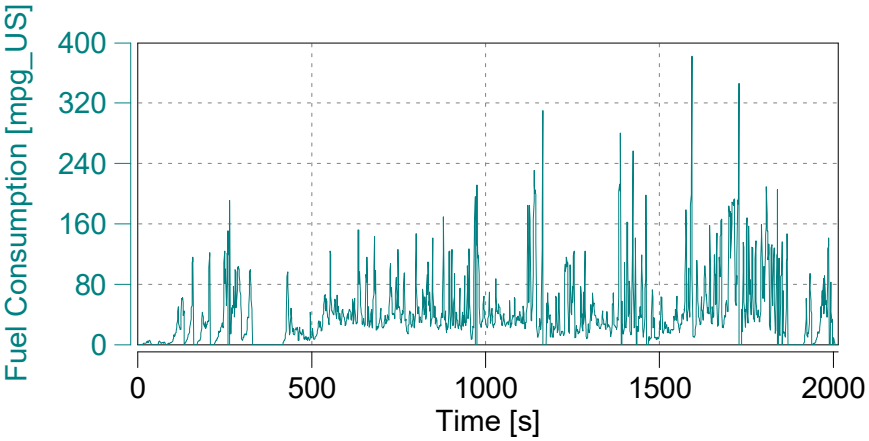
Vehicle: 213-20667 /
Engine: /
NOx Ambient Condition Corr.: 7 - CFR40 §1065.670
Dry / Wet Corr.: 2 - CFR40 §86.1342-90

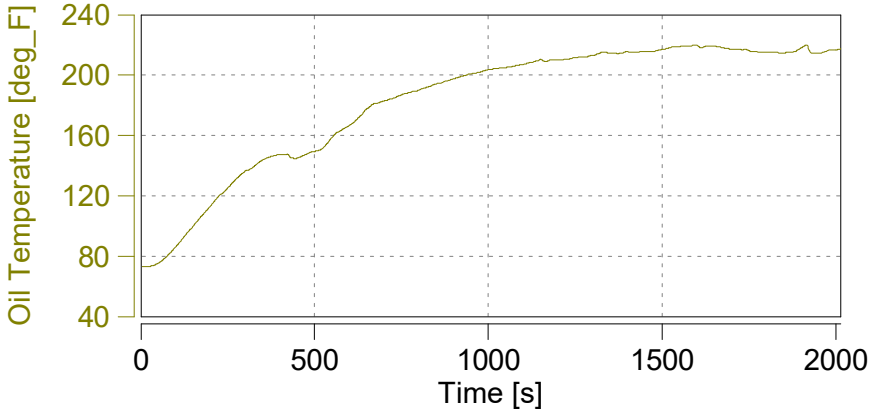
'213-20667_A0 Transfer LATC to CARB'
Start Date: 04/14/2022
Start Time: 10:01:13.0

AVL
Concerto M.O.V.E, 2019









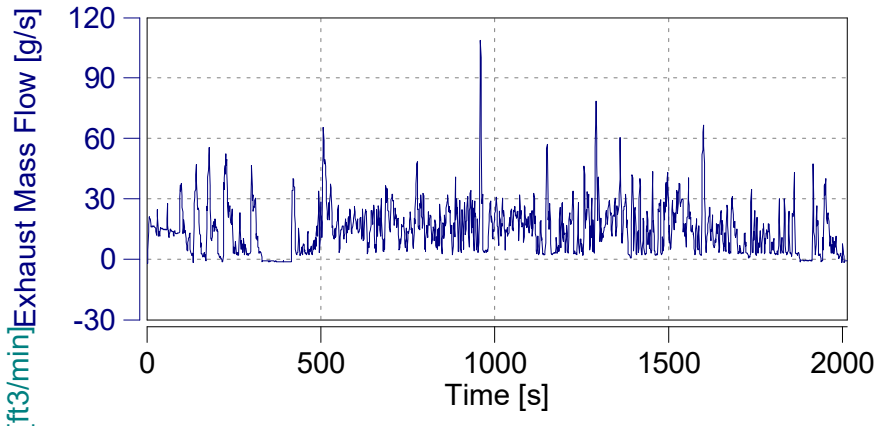
Concerto Version: 505 Build 171, Serial Number: 1604
M.O.V.E Post-Processing: DT_1R4.1_B340
Legislation:

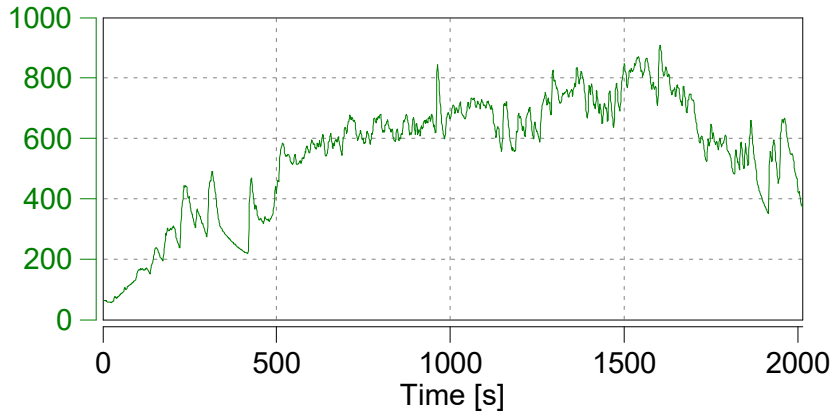
Vehicle: 213-20667 /
Engine: /
NOx Ambient Condition Corr.: 7 - CFR40 §1065.670
Dry / Wet Corr.: 2 - CFR40 §86.1342-90

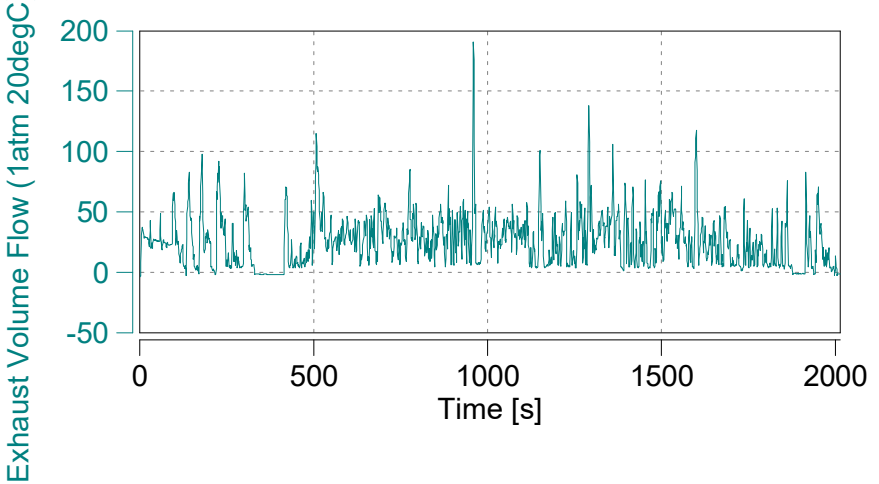
Case: 213-20667
Page: Exhaust Flow (1)

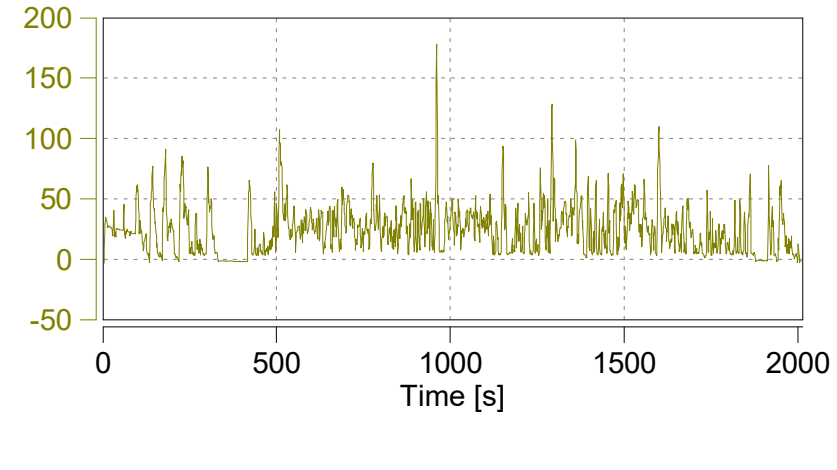
'213-20667_A0 Transfer LATC to CARB'
Start Date: 04/14/2022
Start Time: 10:01:13.0

AVL
Concerto M.O.V.E, 2019









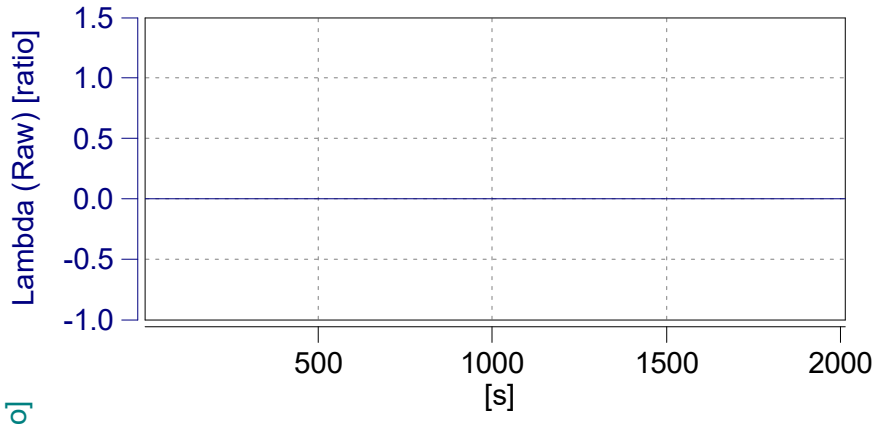
Concerto Version: 505 Build 171, Serial Number: 1604
M.O.V.E Post-Processing: DT_1R4.1_B340
Legislation:

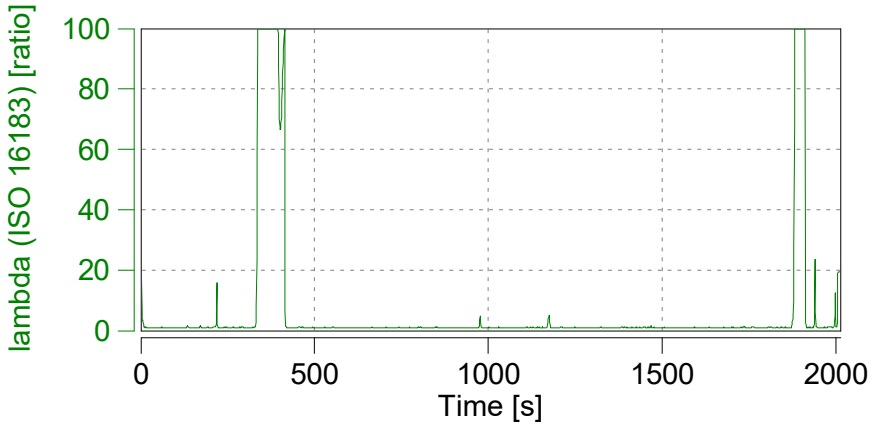
Vehicle: 213-20667 /
Engine: /
NOx Ambient Condition Corr.: 7 - CFR40 §1065.670
Dry / Wet Corr.: 2 - CFR40 §86.1342-90

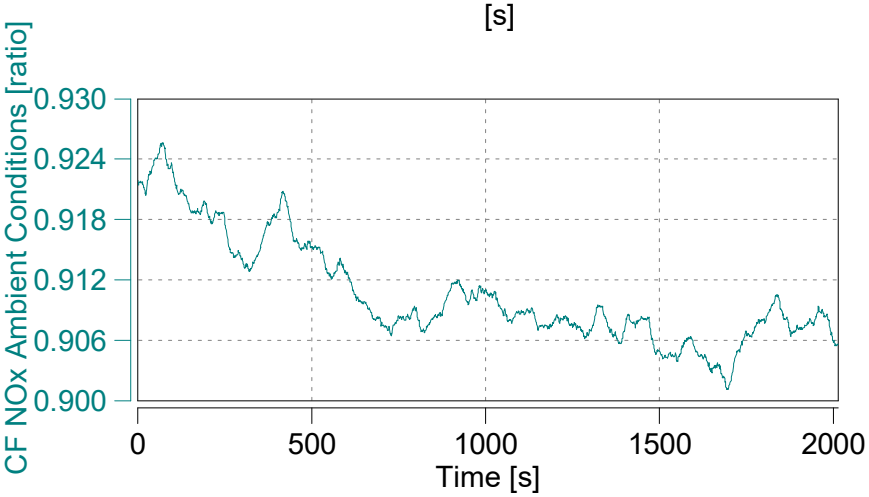
Case: 213-20667
Page: Exhaust Flow (2)

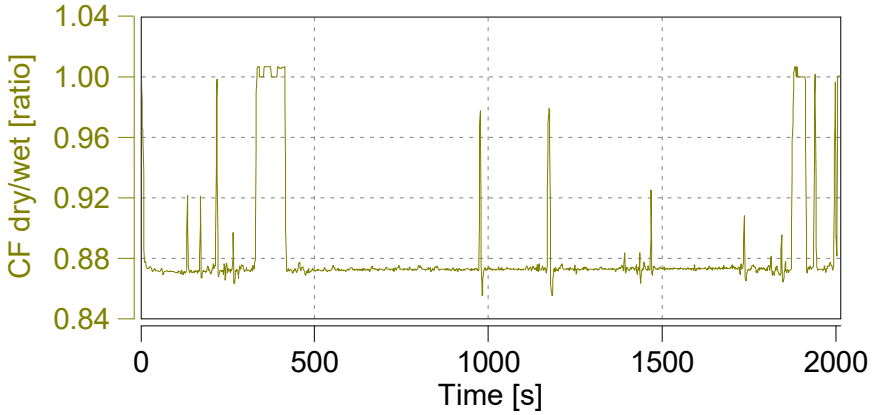
'213-20667_A0 Transfer LATC to CARB'
Start Date: 04/14/2022
Start Time: 10:01:13.0

AVL
Concerto M.O.V.E, 2019









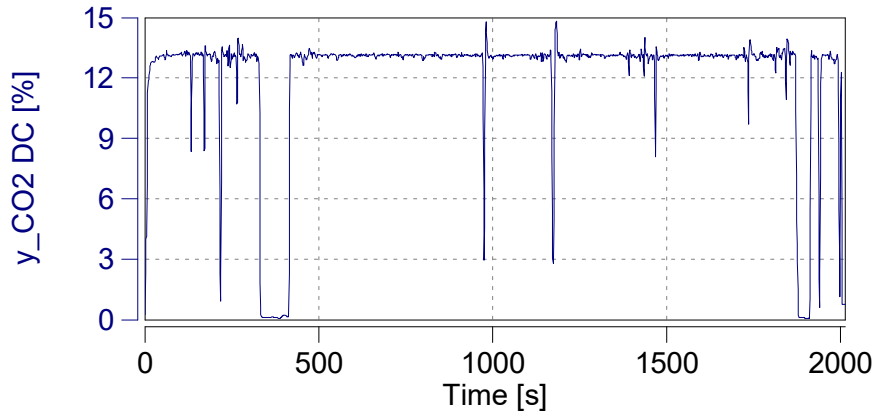
Concerto Version: 505 Build 171, Serial Number: 1604
M.O.V.E Post-Processing: DT_1R4.1_B340
Legislation:

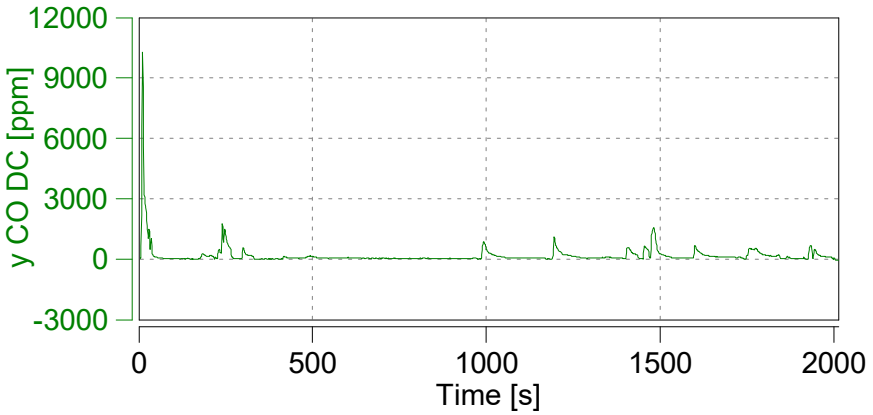
Vehicle: 213-20667 /
Engine: /
NOx Ambient Condition Corr.: 7 - CFR40 §1065.670
Dry / Wet Corr.: 2 - CFR40 §86.1342-90

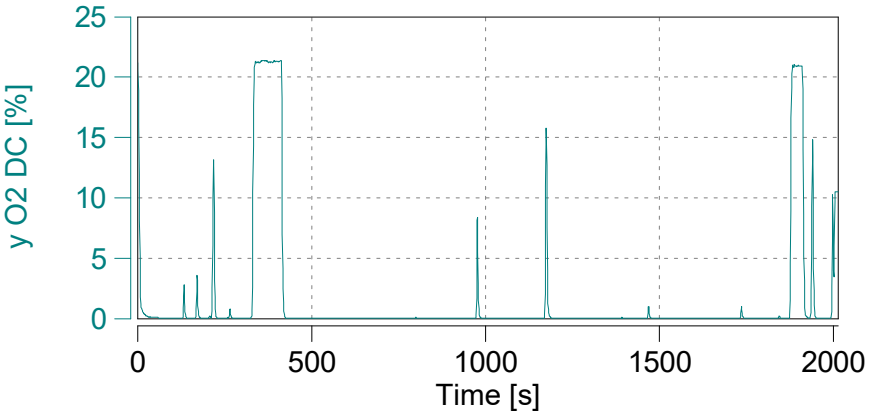
Case: 213-20667
Page: Corrected Emissions (1)

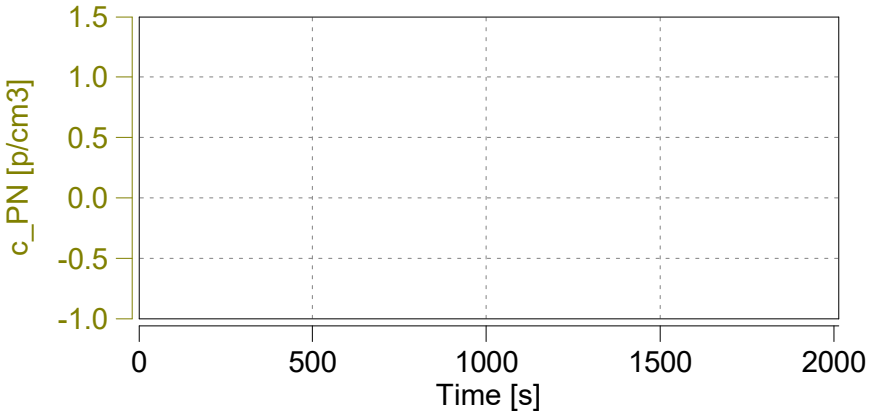
'213-20667_A0 Transfer LATC to CARB'
Start Date: 04/14/2022
Start Time: 10:01:13.0

AVL
Concerto M.O.V.E, 2019









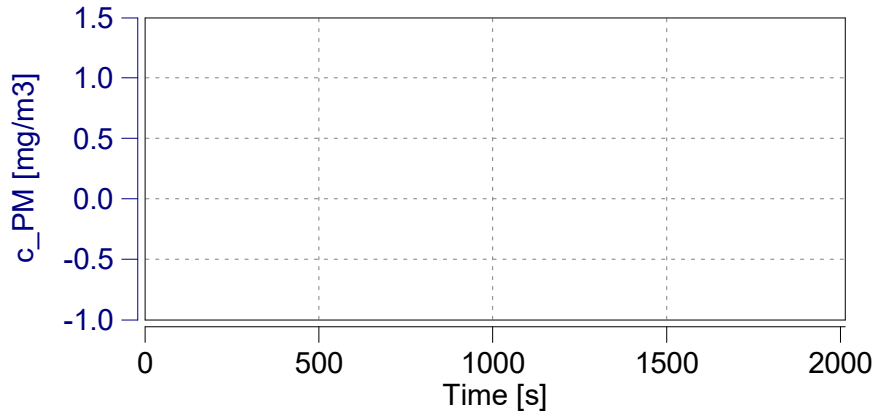
Concerto Version: 505 Build 171, Serial Number: 1604
M.O.V.E Post-Processing: DT_1R4.1_B340
Legislation:

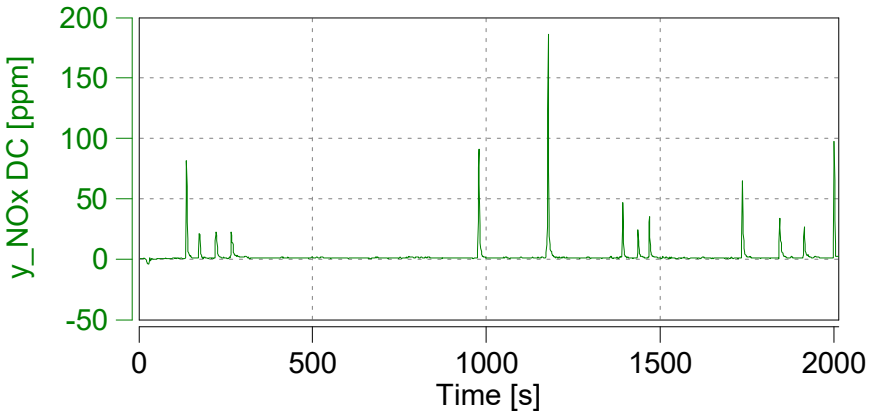
Vehicle: 213-20667 /
Engine: /
NOx Ambient Condition Corr.: 7 - CFR40 §1065.670
Dry / Wet Corr.: 2 - CFR40 §86.1342-90

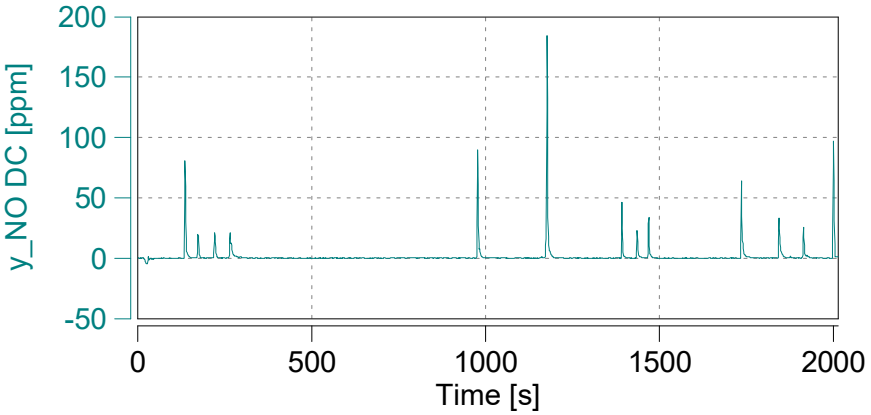
Case: 213-20667
Page: Corrected Emissions (2)

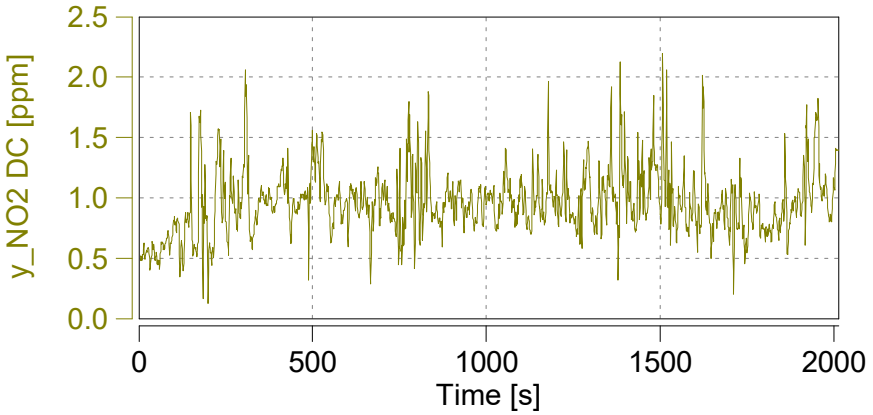
'213-20667_A0 Transfer LATC to CARB'
Start Date: 04/14/2022
Start Time: 10:01:13.0

AVL
Concerto M.O.V.E, 2019









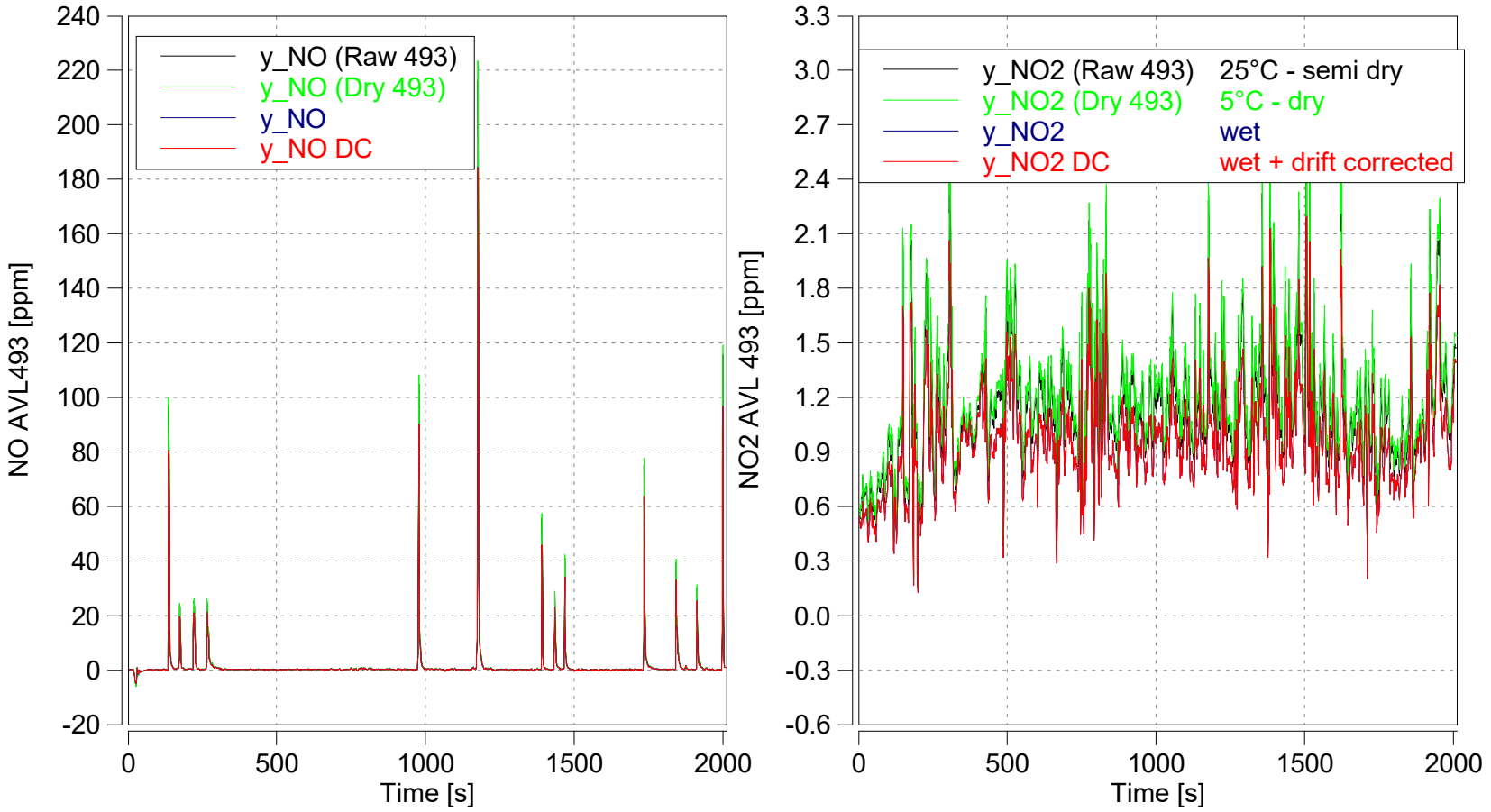
Concerto Version: 505 Build 171, Serial Number: 1604
M.O.V.E Post-Processing: DT_1R4.1_B340
Legislation:

Vehicle: 213-20667 /
Engine: /
NOx Ambient Condition Corr.: 7 - CFR40 §1065.670
Dry / Wet Corr.: 2 - CFR40 §86.1342-90

Case: 213-20667
Page: Corrected Emissions (3)

'213-20667_A0 Transfer LATC to CARB'
Start Date: 04/14/2022
Start Time: 10:01:13.0

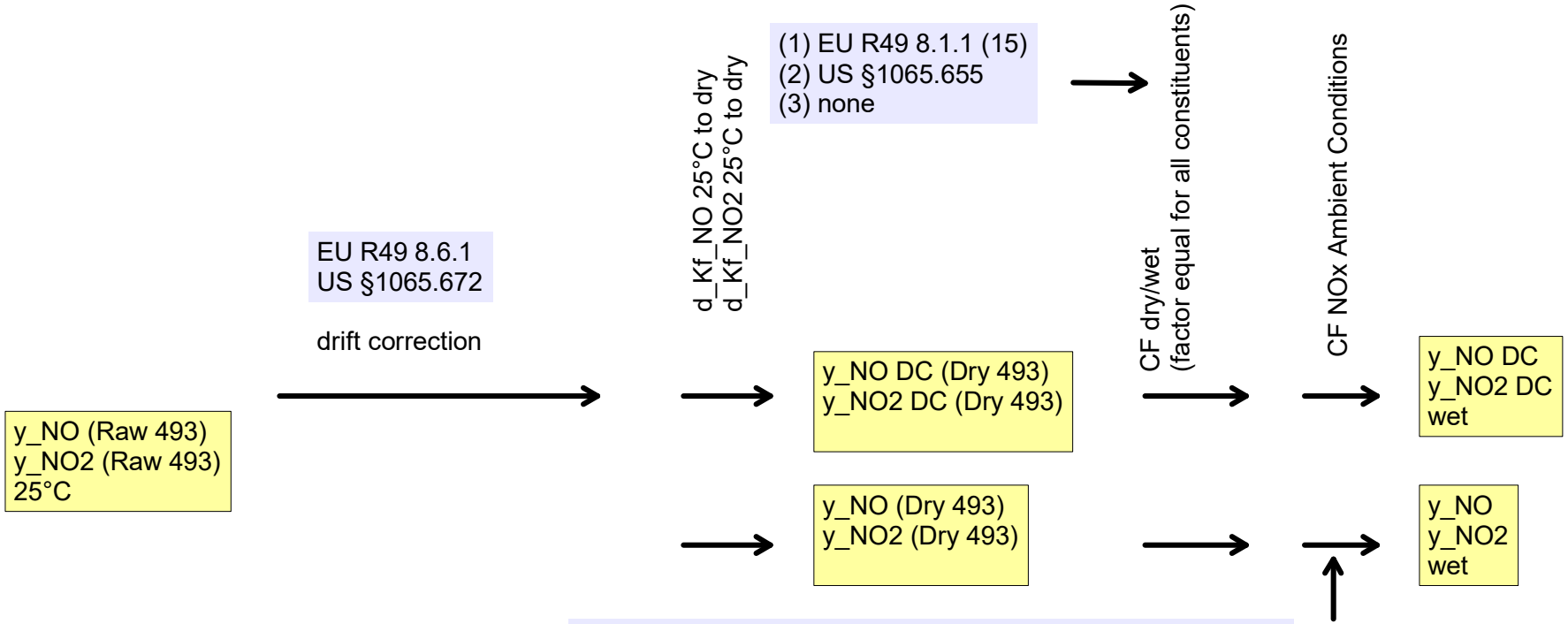
AVL
Concerto M.O.V.E, 2019



Concerto Version: 505 Build 171, Serial Number: 1604
M.O.V.E Post-Processing: DT_1R4.1_B340
Legislation:

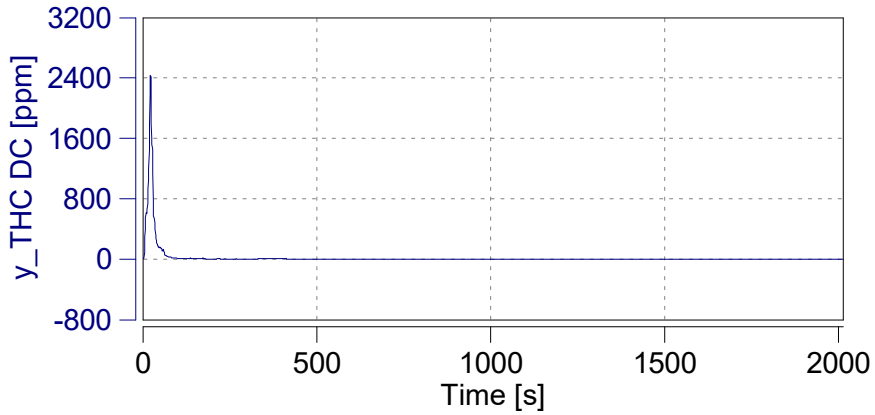
Vehicle: 213-20667 /
Engine: /
NOx Ambient Condition Corr.: 7 - CFR40 §1065.670
Dry / Wet Corr.: 2 - CFR40 §86.1342-90

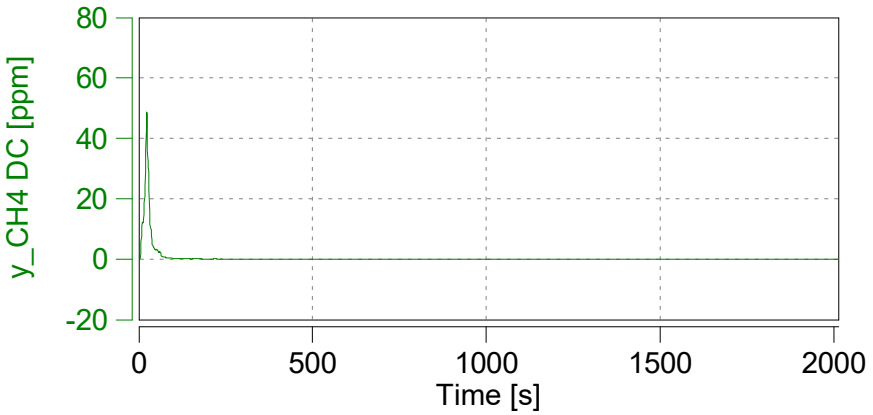
NOx - AVL 493

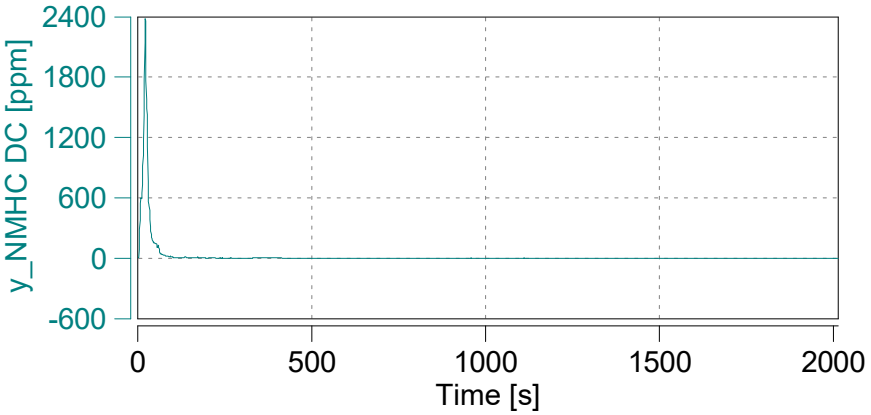

y_NO (Raw 493)
y_NO2 (Raw 493)
25°C
EU R49 8.6.1
US §1065.672
drift correction
d_Kf_NO 25°C to dry
d_Kf_NO2 25°C to dry
(1) EU R49 8.1.1 (15)
(2) US §1065.655
(3) none
y_NO DC (Dry 493)
y_NO2 DC (Dry 493)
y_NO (Dry 493)
y_NO2 (Dry 493)
CF dry/wet
(factor equal for all constituents)
CF NOx Ambient Conditions
y_NO DC
y_NO2 DC
wet
y_NO
y_NO2
wet
(1) HD Diesel Engine SwRI FinalReport 08-2597, 1999
(2) humidity only
(3) equivalent uncorrected NOx limit method for EU in service
(4) US §40.86.1342.94 Diesel
(5) US §40.86.1342.94 SI
(6) US §40.86.1370–2007 (default US)
(7) US 40.1065.670
(8) none (default EU)

'213-20667_A0 Transfer LATC to CARB'
Start Date: 04/14/2022
Start Time: 10:01:13.0

AVL
Concerto M.O.V.E, 2019







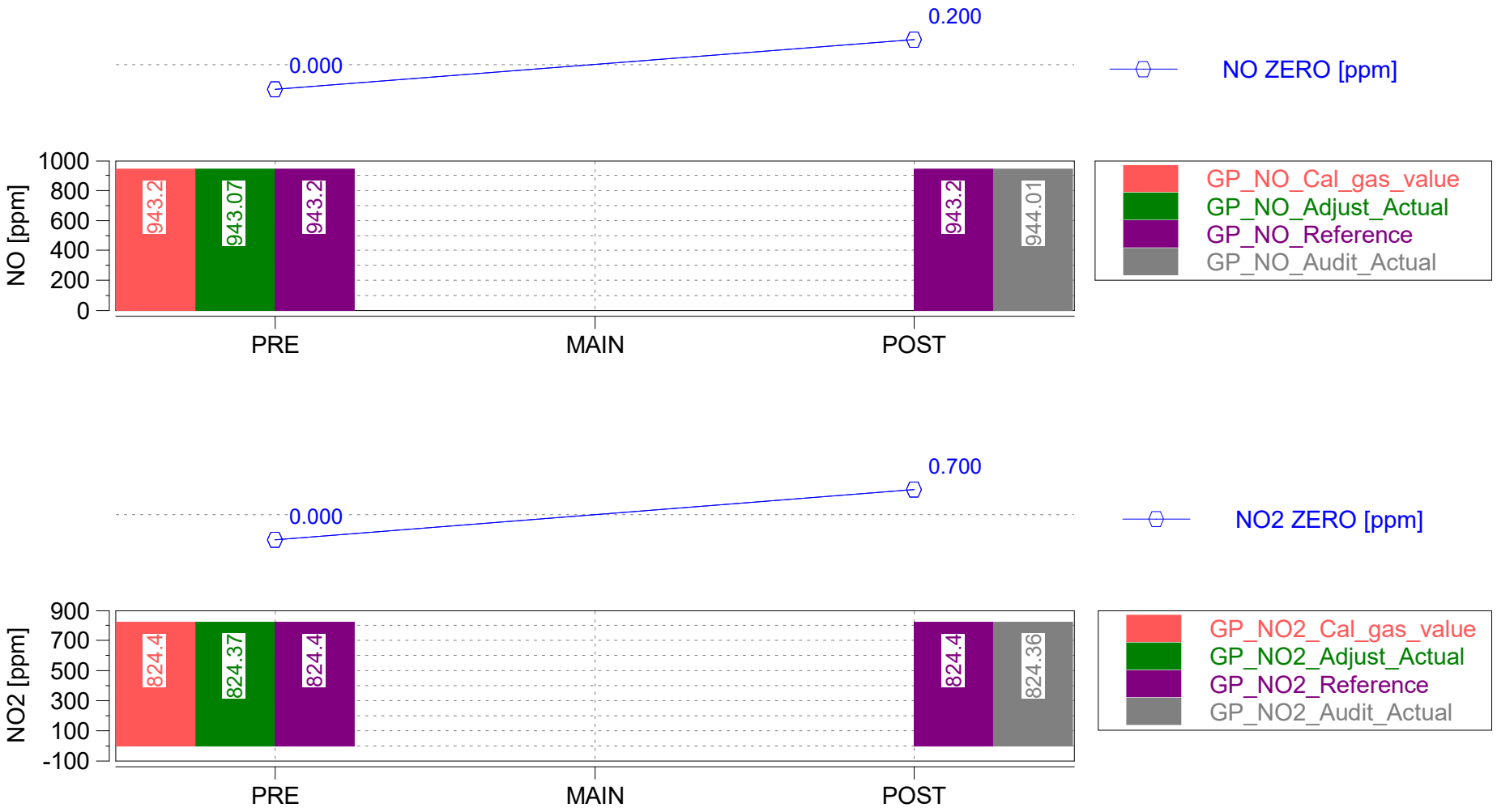
Concerto Version: 505 Build 171, Serial Number: 1604
M.O.V.E Post-Processing: DT_1R4.1_B340
Legislation:

Vehicle: 213-20667 /
Engine: /
NOx Ambient Condition Corr.: 7 - CFR40 §1065.670
Dry / Wet Corr.: 2 - CFR40 §86.1342-90

Case: 213-20667
Page: NO/NO2/NOx Zero - Span

'213-20667_A0 Transfer LATC to CARB'
Start Date: 04/14/2022
Start Time: 10:01:13.0

AVL
Concerto M.O.V.E, 2019



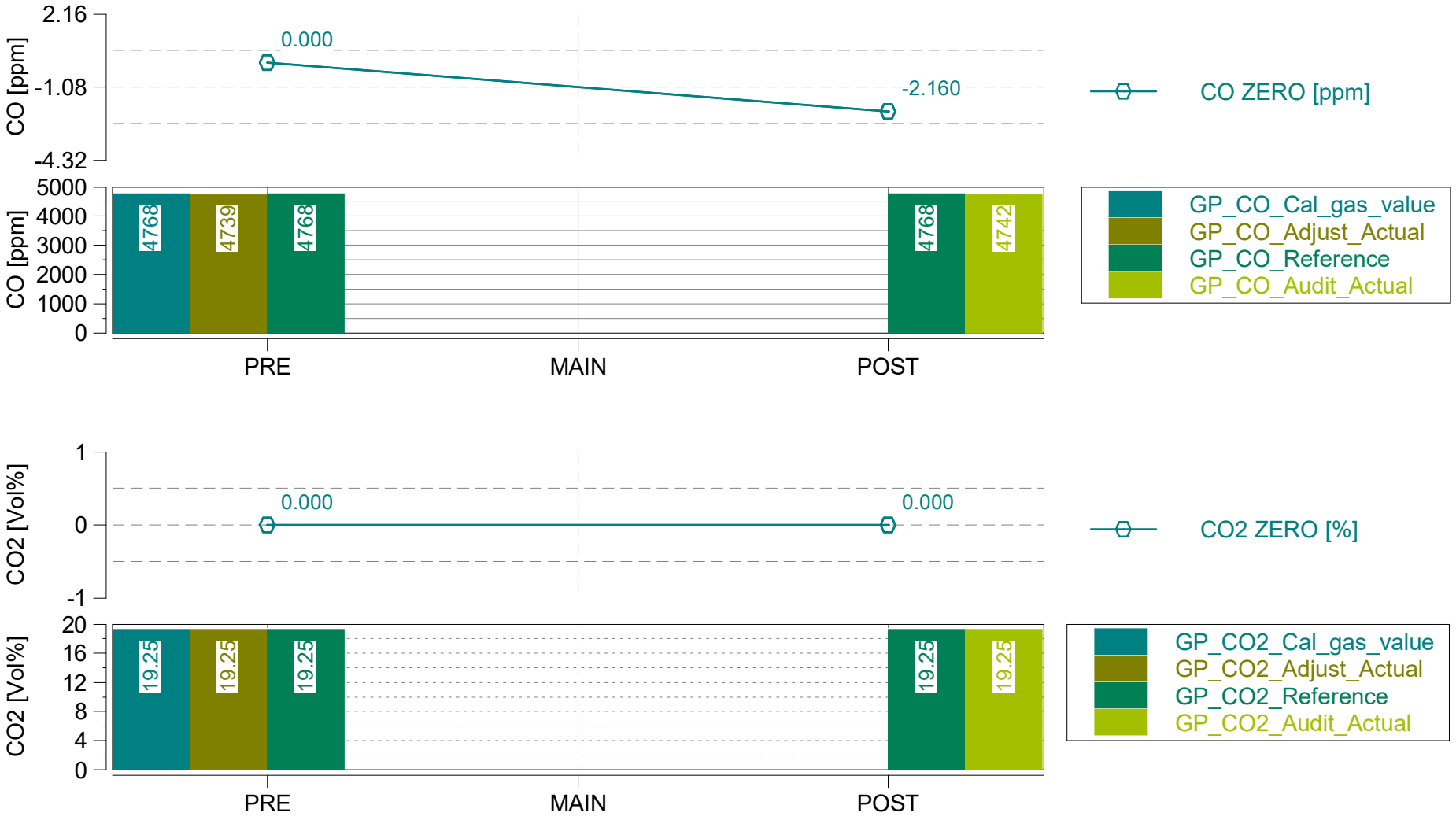
Concerto Version: 505 Build 171, Serial Number: 1604
M.O.V.E Post-Processing: DT_1R4.1_B340
Legislation:

Vehicle: 213-20667 /
Engine: /
NOx Ambient Condition Corr.: 7 - CFR40 §1065.670
Dry / Wet Corr.: 2 - CFR40 §86.1342-90

Case: 213-20667
Page: CO/CO2 Zero - Span

'213-20667_A0 Transfer LATC to CARB'
Start Date: 04/14/2022
Start Time: 10:01:13.0

AVL
Concerto M.O.V.E, 2019



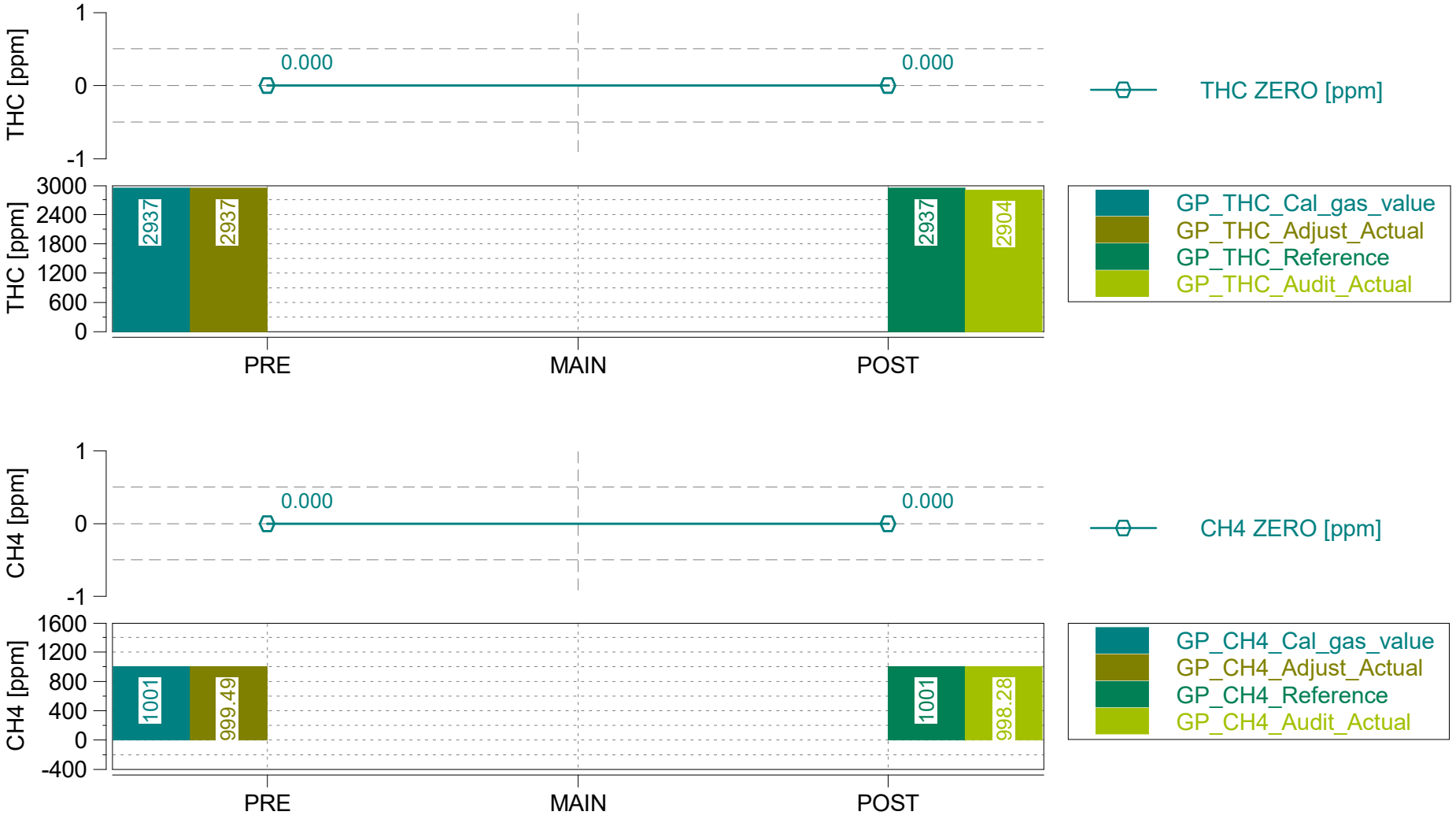
Concerto Version: 505 Build 171, Serial Number: 1604
M.O.V.E Post-Processing: DT_1R4.1_B340
Legislation:

Vehicle: 213-20667 /
Engine: /
NOx Ambient Condition Corr.: 7 - CFR40 §1065.670
Dry / Wet Corr.: 2 - CFR40 §86.1342-90

Case: 213-20667
Page: THC/CH4 Zero - Span

'213-20667_A0 Transfer LATC to CARB'
Start Date: 04/14/2022
Start Time: 10:01:13.0

AVL
Concerto M.O.V.E, 2019



Concerto Version: 505 Build 171, Serial Number: 1604
M.O.V.E Post-Processing: DT_1R4.1_B340
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NOx Ambient Condition Corr.: 7 - CFR40 §1065.670
Dry / Wet Corr.: 2 - CFR40 §86.1342-90

§	criterium	condition	value	unit	pass/fail
GAS Leak Check	The leakage rate on the vacuum side shall not exceed 0.5 per cent of the in-use flow rate for the portion of the system being checked.	The leakage rate <= 0.5%	**0.00**	**%**	pass
PN Leak Check	n/a	n/a	**n/a**	**n/a**	n/a
PM Leak Check	n/a	n/a	**n/a**	**n/a**	n/a

GAS PEMS Devices

Device ID	AVL492
Serial Number	0625
Firmware Version	V1.17
Main Test Date	2022-04-14
Leak Check Age [days]	0

Device ID	AVL4925iS
Serial Number	184
Firmware Version	1.22.0.4

EFM

Device ID	AVL495
Serial Number	00826
Serial Number Tube	01080
Firmware Version	V1.16

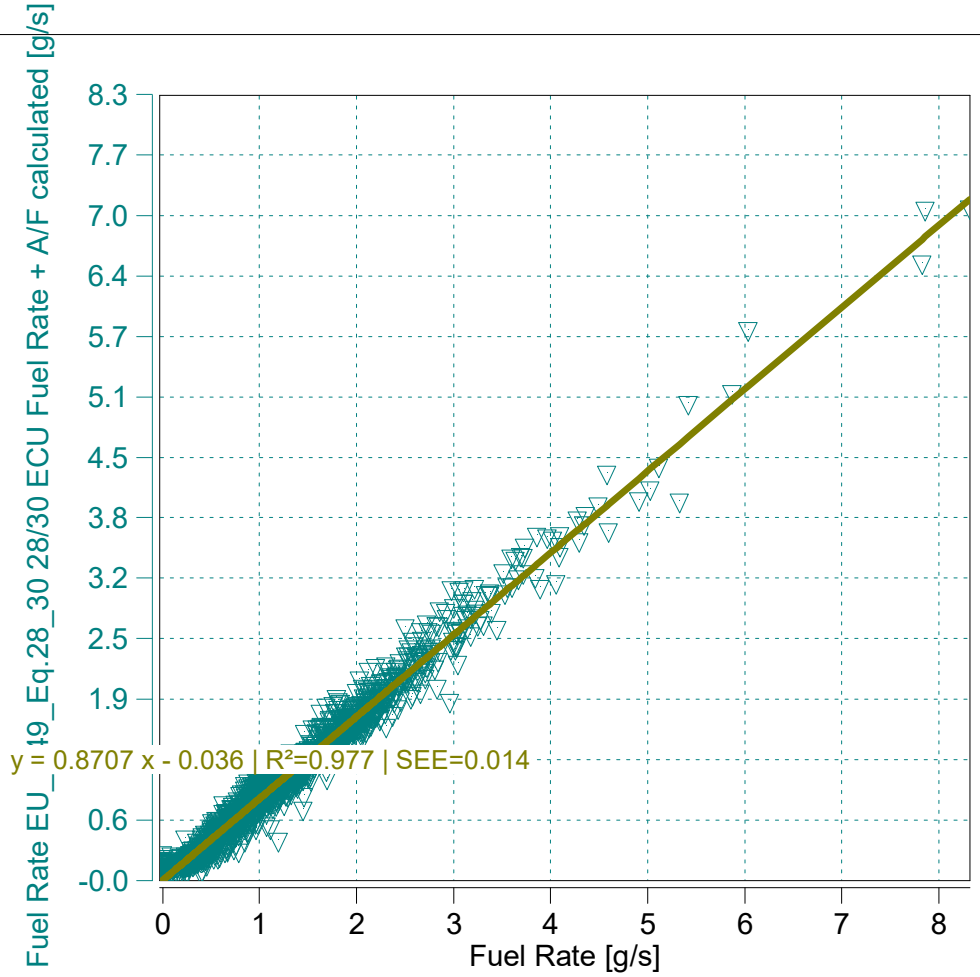
System Control

SC Version	V2.9_237
SC Serial Number	60300923

Case: 213-20667
Page: Fuel Rate ECU vs. Calculated

'213-20667_A0 Transfer LATC to CARB'
Start Date: 04/14/2022
Start Time: 10:01:13.0

AVL
Concerto M.O.V.E, 2019



EU 582/2011/Appendix I/3.2.1 | Fuel Rate ECU and calculated

y = 0.8707 x - 0.036 | R²=0.977 | SEE=0.014
m = 0.87 (0.9 - 1.1 recommended)
R² = 0.98 (min 0.9 mandatory)

Data from - to [% of Maximum]

0 100

Concerto Version: 505 Build 171, Serial Number: 1604
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Dry / Wet Corr.: 2 - CFR40 §86.1342-90

Case: 213-20667
Page: Trip Summary

'213-20667 LA City'
Start Date: 04/11/2022
Start Time: 09:24:59.0

AVL
Concerto M.O.V.E, 2019

Trip Duration	3090.00	s
Trip Duration (a)	3090.00	s
Trip Distance	16.06	mi
Trip Distance (a)	16.06	mi
Trip Fuel Cons. (b)	1.87	kg
Trip Fuel Cons. (ab)	1.87	kg
Trip Fuel Cons. EU (ac)	1.61	kg
Trip Fuel Cons. US (ac)	1.60	kg
Trip Fuel Economy (b)	24.27	mpg_US
Trip Fuel Economy (ab)	24.27	mpg_US
Trip Fuel Economy EU (ac)	28.31	mpg_US
Trip Fuel Economy US (ac)	28.49	mpg_US
Trip Fuel Economy GGE (b)	24.27	mpg_US
Trip Fuel Economy GGE (ab)	24.27	mpg_US
Trip Fuel Economy EU GGE (ac)	28.31	mpg_US
Trip Fuel Economy US GGE (ac)	28.49	mpg_US
Trip Av. Eng. Speed	913.10	rpm
Trip Av. Torque	38.12	lbft
Trip Av. Power	10.29	hp
Trip Work		
Trip Work (a)	8.83	hphr
Trip Exhaust Mass	23.88	kg
Trip Exhaust Mass EU (ac)	28.93	kg
Trip Exhaust Mass US (ac)	29.20	kg
Trip Av. Amb. Temperature	68.39	deg_F
Trip Av. Humidity	52.55	%
Trip Av. GPS Altitude	66.87	m
Fuel Type	Petrol (E10)	

ave THC	-0.28501	ppm
ave NMHC	-0.27931	ppm
ave CH4	-0.00570	ppm
ave CO	140.45942	ppm
ave CO2	9.46271	%
ave NOx	2.50298	ppm
ave PM	n/a	mg/m3
ave Soot meas	n/a	mg/m3
ave Soot	n/a	mg/m3
ave PN	n/a	#/cm3
tot THC	0.00008	g
tot NMHC	0.00007	g
tot CH4	0.00000	g
tot CO	4.32646	g
tot CO2	4851.22131	g
tot NO (d)	0.08689	g
tot NO2	0.04430	g
tot NOx	0.12769	g
tot Soot	n/a	g
tot Soot meas	n/a	g
tot PM	n/a	g
tot PN	n/a	#
PM measurement type	0.00000	-
tot Soot on PM filter (estim.)	0.00000	mg
Soot --> PM simple scaling factor	1.00000	-
Trip Av. Veh. Speed	18.71103	mi/hr
Trip Distance Share Urban	72.28684	% distanc
Trip Distance Share Rural	8.22060	% distanc
Trip Distance Share Motorway	19.49255	% distanc

BS CO2	549.14126	g/hphr
BS CO	0.48974	g/hphr
BS THC	0.00001	g/hphr
BS NMHC	0.00001	g/hphr
BS CH4	0.00000	g/hphr
BS NO (d)	0.00984	g/hphr
BS NO2	0.00501	g/hphr
BS NOx	0.01445	g/hphr
BS Soot	n/a	g/hphr
BS Soot meas	n/a	g/hphr
BS PM	n/a	g/hphr
BS PN	n/a	#/hpr
DS CO2	302.06290	g/mi
DS CO	0.26939	g/mi
DS THC	0.00000	g/mi
DS NMHC	0.00000	g/mi
DS CH4	0.00000	g/mi
DS NO (d)	0.00541	g/mi
DS NO2	0.00276	g/mi
DS NOx	0.00795	g/mi
DS Soot	n/a	g/mi
DS Soot meas	n/a	g/mi
DS PM	n/a	g/mi
DS PN	n/a	#/mi
FS CO2	2590.33412	g/kg
FS CO	2.31014	g/kg
FS THC	0.00004	g/kg
FS NMHC	0.00004	g/kg
FS CH4	0.00000	g/kg
FS NO (d)	0.04639	g/kg
FS NO2	0.02366	g/kg
FS NOx	0.06818	g/kg
FS Soot	n/a	g/kg
FS Soot meas	n/a	g/kg
FS PM	n/a	g/kg
FS PN	n/a	#/kg

(a) GAS PEMS measurement state only, (b) based on fuel rate input (ECU, Fuel Meter), (c) Based on A/F ratio (eq 28-32 - R49)
(d) NO calculated using molecular weight of NO2, GGE=Gasoline Gallon Equivalents

Concerto Version: 505 Build 171, Serial Number: 1604
M.O.V.E Post-Processing: DT_1R4.1_B340
Legislation:

Vehicle: 213-20667 /
Engine: /
NOx Ambient Condition Corr.: 7 - CFR40 §1065.670
Dry / Wet Corr.: 2 - CFR40 §86.1342-90

Case: 213-20667
Page: Trip Summary Drift Corrected

'213-20667 LA City'
Start Date: 04/11/2022
Start Time: 09:24:59.0

AVL
Concerto M.O.V.E, 2019

Trip Duration	3090.00	s
Trip Duration (a)	3090.00	s
Trip Distance	16.06	mi
Trip Distance (a)	16.06	mi
Trip Fuel Cons. (b)	1.87	kg
Trip Fuel Cons. (ab)	1.87	kg
Trip Fuel Cons. EU (ac)	1.61	kg
Trip Fuel Cons. US (ac)	1.60	kg
Trip Fuel Economy (b)	24.27	mpg_US
Trip Fuel Economy (ab)	24.27	mpg_US
Trip Fuel Economy EU (ac)	28.31	mpg_US
Trip Fuel Economy US (ac)	28.49	mpg_US
Trip Fuel Economy GGE (b)	24.27	mpg_US
Trip Fuel Economy GGE (ab)	24.27	mpg_US
Trip Fuel Economy EU GGE (ac)	28.31	mpg_US
Trip Fuel Economy US GGE (ac)	28.49	mpg_US
Trip Av. Eng. Speed	913.10	rpm
Trip Av. Torque	38.12	lbft
Trip Av. Power	10.29	hp
Trip Work		
Trip Work (a)	8.83	hphr
Trip Exhaust Mass	23.88	kg
Trip Exhaust Mass EU (ac)	28.93	kg
Trip Exhaust Mass US (ac)	29.20	kg
Trip Av. Amb. Temperature	68.39	deg_F
Trip Av. Humidity	52.55	%
Trip Av. GPS Altitude	66.87	m
Fuel Type	Petrol (E10)	

ave THC DC	-0.28578	ppm
ave NMHC DC	-0.28007	ppm
ave CH4 DC	-0.00572	ppm
ave CO DC	139.35189	ppm
ave CO2 DC	9.46763	%
ave NOx DC	2.50170	ppm
ave PM	n/a	mg/m3
ave Soot meas	n/a	mg/m3
ave Soot	n/a	mg/m3
ave PN DC		
tot THC DC	0.00008	g
tot NMHC DC	0.00007	g
tot CH4 DC	0.00000	g
tot CO DC	4.29235	g
tot CO2 DC	4853.74273	g
tot NO DC (d)	0.08684	g
tot NO2 DC	0.04428	g
tot NOx DC	0.12762	g
tot Soot	n/a	g
tot Soot meas	n/a	g
tot PM	n/a	g
tot PN DC		
PM measurement type	0.00000	-
tot Soot on PM filter (estim.)	0.00000	mg
Soot --> PM simple scaling factor	1.00000	-
Trip Av. Veh. Speed	18.71103	mi/hr
Trip Distance Share Urban	72.28684	% distanc
Trip Distance Share Rural	8.22060	% distanc
Trip Distance Share Motorway	19.49255	% distanc

BS CO2 DC	549.42668	g/hphr
BS CO DC	0.48588	g/hphr
BS THC DC	0.00001	g/hphr
BS NMHC DC	0.00001	g/hphr
BS CH4 DC	0.00000	g/hphr
BS NO DC (d)	0.00983	g/hphr
BS NO2 DC	0.00501	g/hphr
BS NOx DC	0.01445	g/hphr
BS Soot	n/a	g/hphr
BS Soot meas	n/a	g/hphr
BS PM	n/a	g/hphr
BS PN DC		
DS CO2 DC	302.21990	g/mi
DS CO DC	0.26726	g/mi
DS THC DC	0.00000	g/mi
DS NMHC DC	0.00000	g/mi
DS CH4 DC	0.00000	g/mi
DS NO DC (d)	0.00541	g/mi
DS NO2 DC	0.00276	g/mi
DS NOx DC	0.00795	g/mi
DS Soot	n/a	g/mi
DS Soot meas	n/a	g/mi
DS PM	n/a	g/mi
DS PN DC		
FS CO2 DC	2591.68045	g/kg
FS CO DC	2.29192	g/kg
FS THC DC	0.00004	g/kg
FS NMHC DC	0.00004	g/kg
FS CH4 DC	0.00000	g/kg
FS NO DC (d)	0.04637	g/kg
FS NO2 DC	0.02364	g/kg
FS NOx DC	0.06815	g/kg
FS Soot	n/a	g/kg
FS Soot meas	n/a	g/kg
FS PM	n/a	g/kg
FS PN DC		

(a) GAS PEMS measurement state only, (b) based on fuel rate input (ECU, Fuel Meter), (c) Based on A/F ratio (eq 28-32 - R49)
(d) NO calculated using molecular weight of NO2, GGE=Gasoline Gallon Equivalents

Concerto Version: 505 Build 171, Serial Number: 1604
M.O.V.E Post-Processing: DT_1R4.1_B340
Legislation:

Vehicle: 213-20667 /
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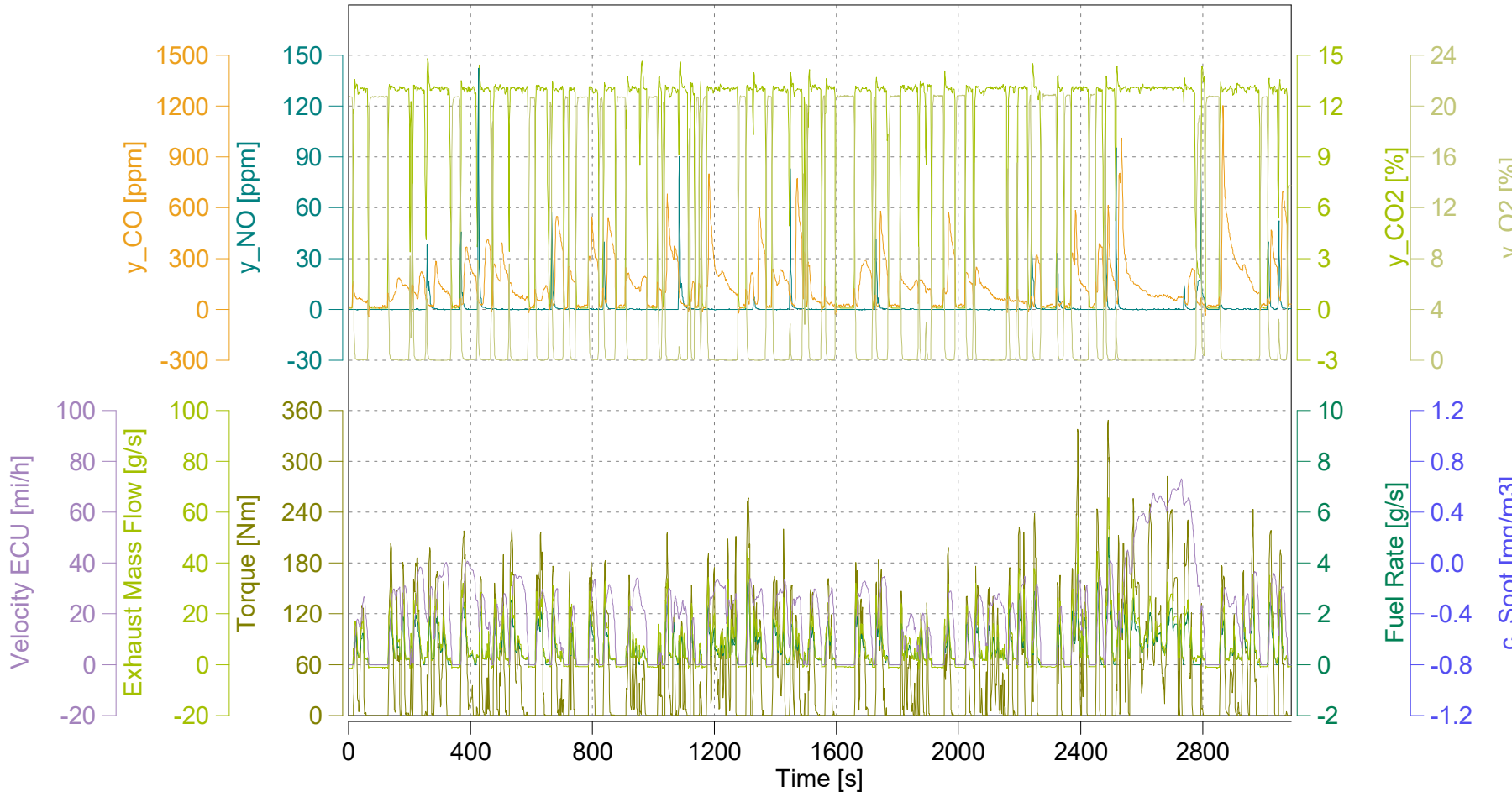
NOx Ambient Condition Corr.: 7 - CFR40 §1065.670
Dry / Wet Corr.: 2 - CFR40 §86.1342-90

Case: 213-20667
Page: Time Alignment Check

'213-20667 LA City'
Start Date: 04/11/2022
Start Time: 09:24:59.0

AVL

Concerto



Absolute Time

y_THC
y_NO
y_CO2
y_O2
c_Soot
Fuel Rate
Exhaust Mass
Torque
Velocity ECU

AVL 492 Defa

THC
NO/NO2
CO/CO2
O2

Apply Defa

Alignment Pl

Reset Time

Reset Al

Apply Curr

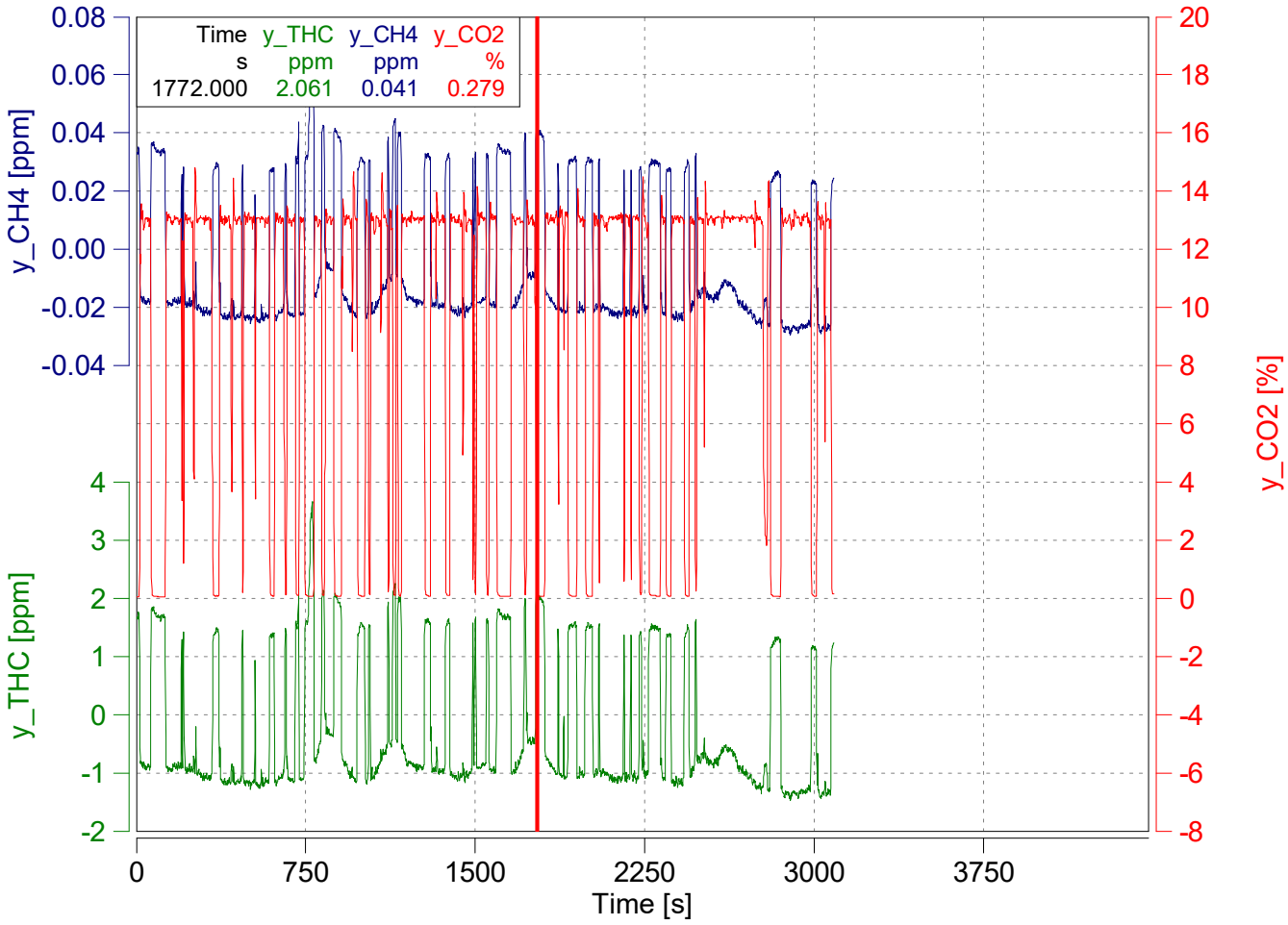
Concerto Version: 505 Build 171, Serial Number: 1604
M.O.V.E Post-Processing: DT_1R4.1_B340
Legislation:

Vehicle: 213-20667 /
Engine: /
NOx Ambient Condition Corr.: 7 - CFR40 §1065.670
Dry / Wet Corr.: 2 - CFR40 §86.1342-90

Case: 213-20667
Page: Time Alignment of Gas Concentrations

'213-20667 LA City'
Start Date: 04/11/2022
Start Time: 09:24:59.0

AVL
Concerto M.O.V.E, 2019



Absolute Time Shifts

y_THC	s	-4.3
y_CH4	s	-6.3

Reset Time Shifts in Plot

Apply Current Values

Concerto Version: 505 Build 171, Serial Number: 1604
M.O.V.E Post-Processing: DT_1R4.1_B340
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NOx Ambient Condition Corr.: 7 - CFR40 §1065.670
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Case: 213-20667
Page: Ambient Conditions

'213-20667 LA City'
Start Date: 04/11/2022
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AVL
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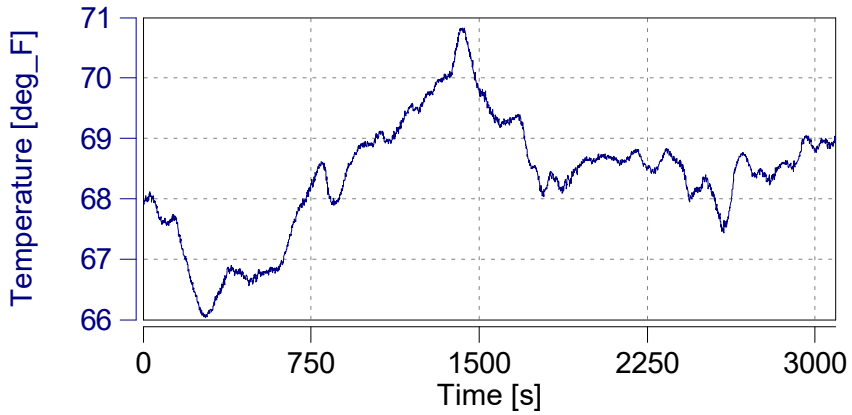

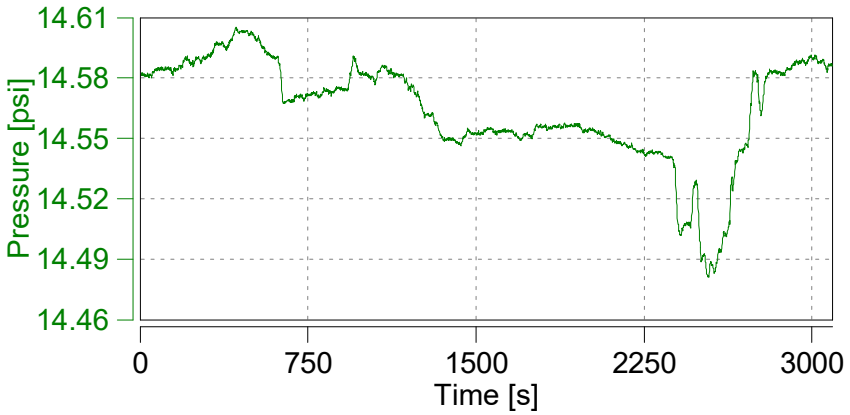

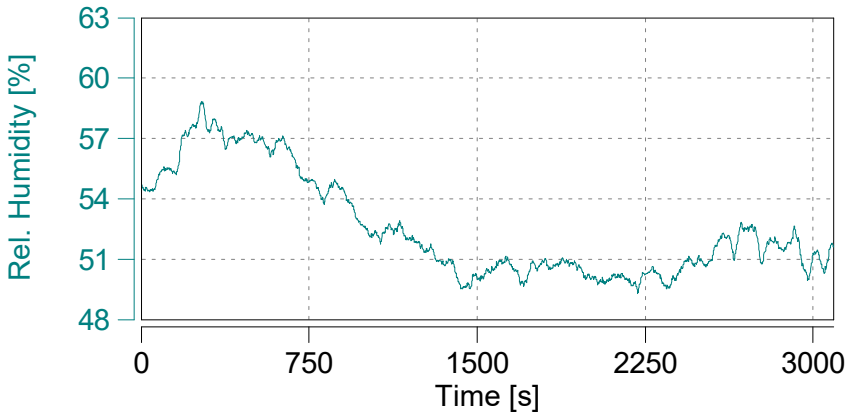

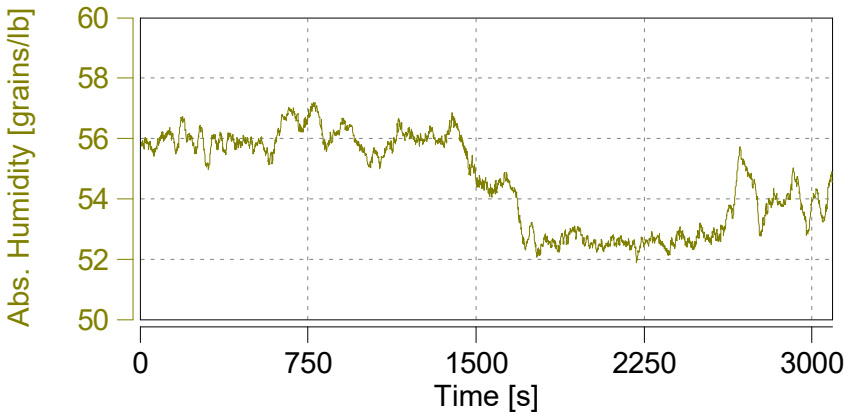

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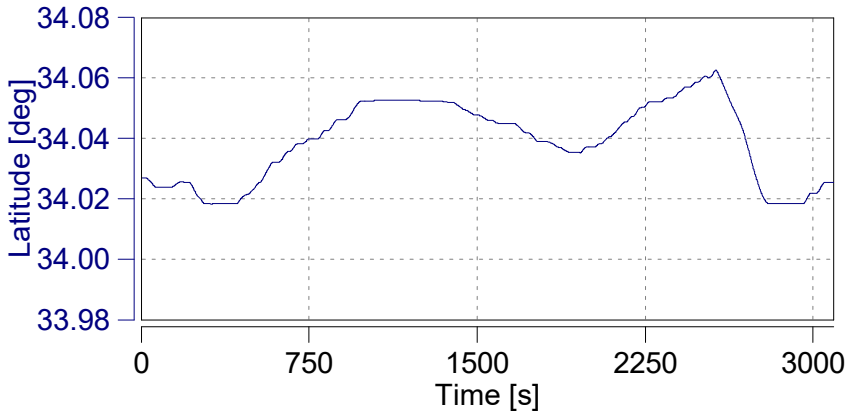
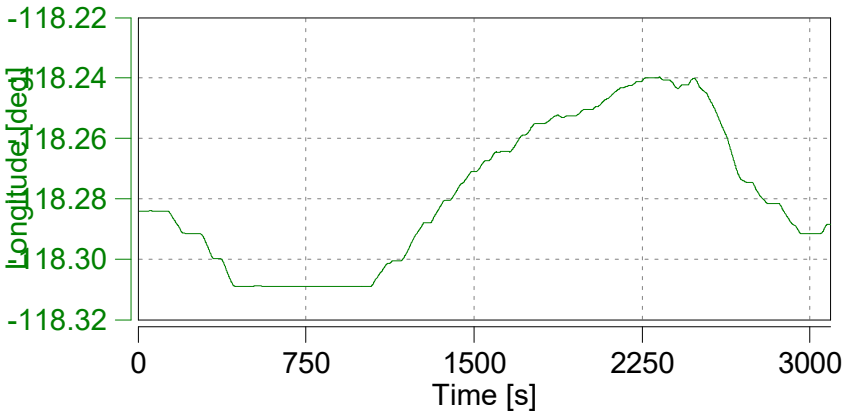
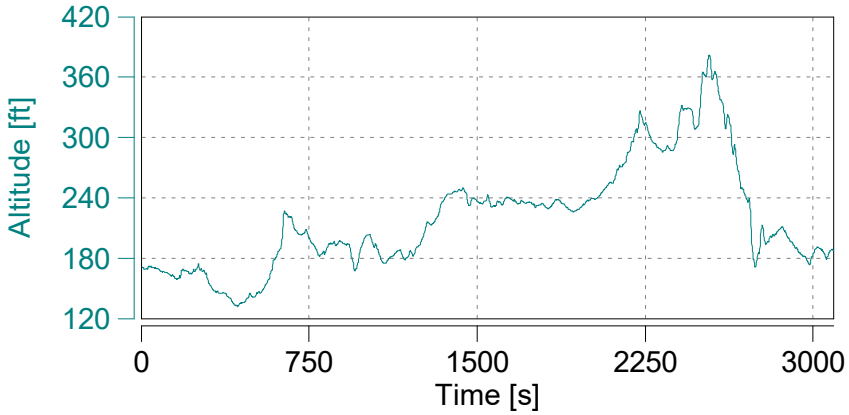
Case: 213-20667
Page: GPS

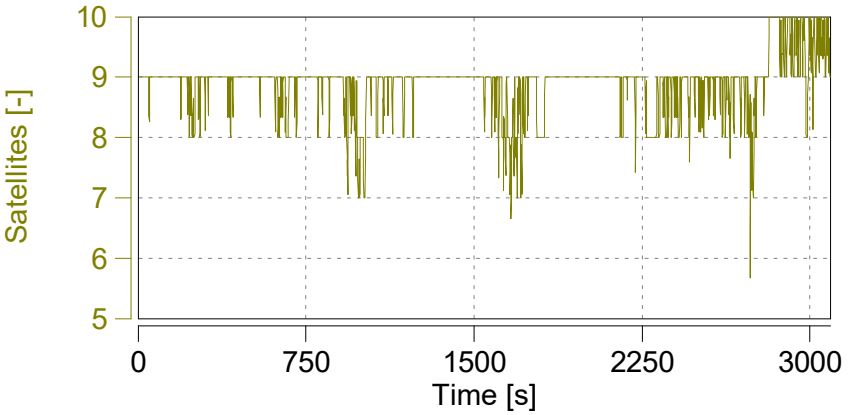
'213-20667 LA City'
Start Date: 04/11/2022
Start Time: 09:24:59.0

AVL
Concerto M.O.V.E, 2019









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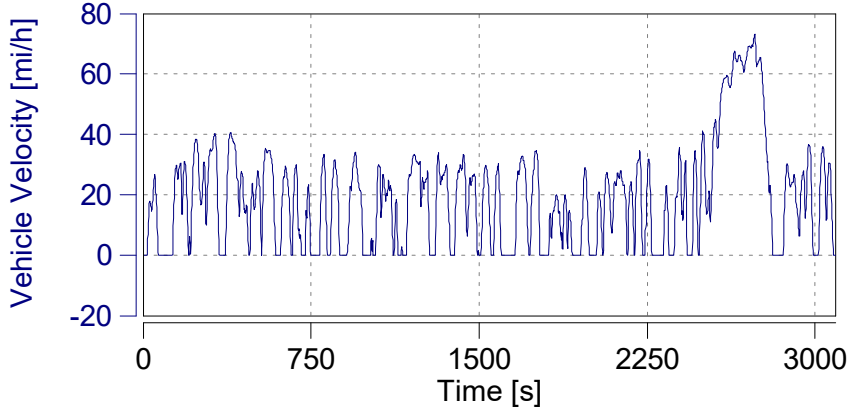
Legislation:

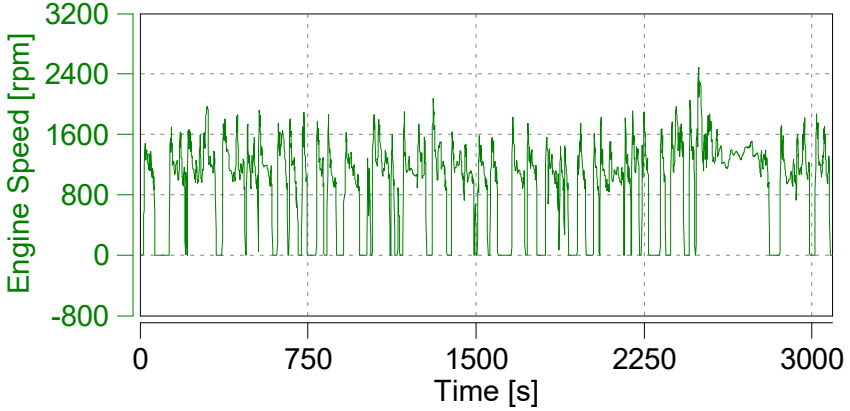
Vehicle: 213-20667 /
Engine: /
NOx Ambient Condition Corr.: 7 - CFR40 §1065.670
Dry / Wet Corr.: 2 - CFR40 §86.1342-90

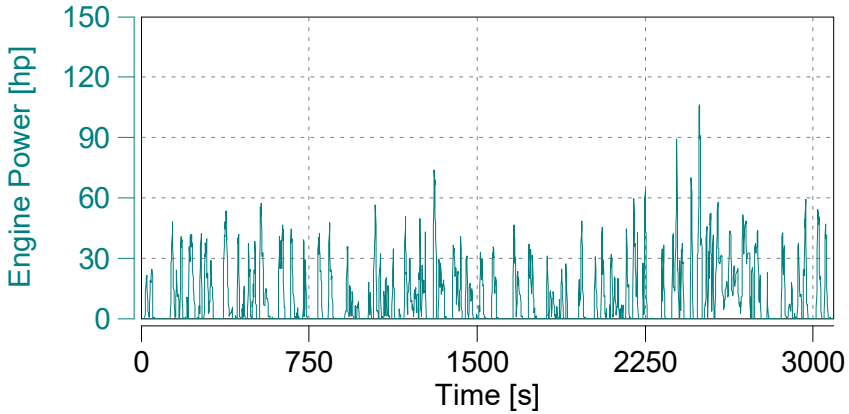
Case: 213-20667
Page: Engine (1)

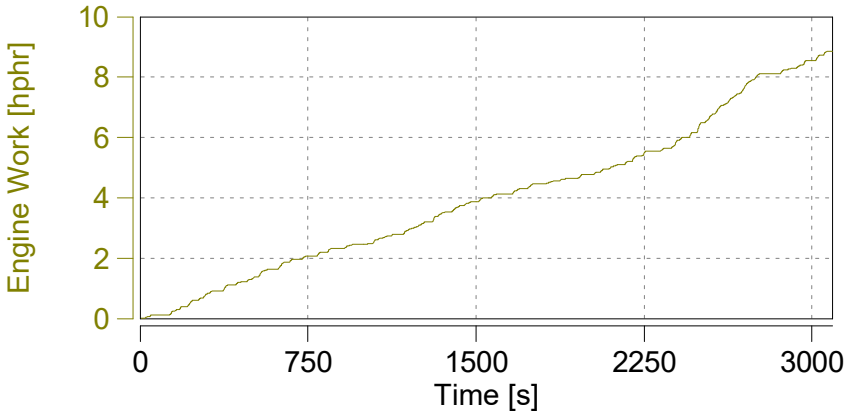
'213-20667 LA City'
Start Date: 04/11/2022
Start Time: 09:24:59.0

AVL
Concerto M.O.V.E, 2019









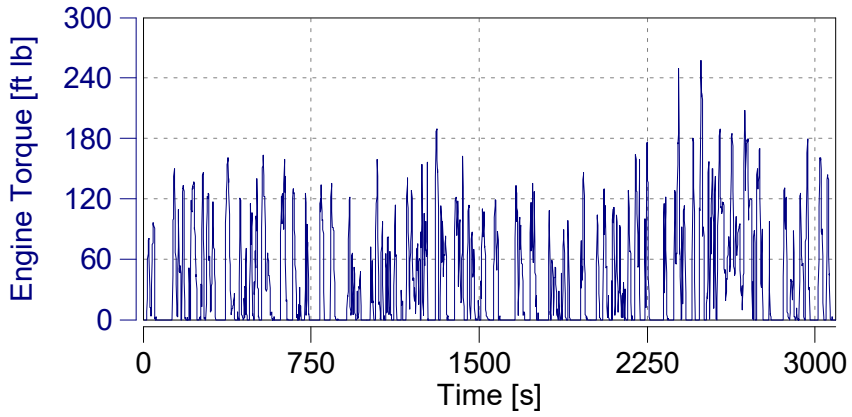
Concerto Version: 505 Build 171, Serial Number: 1604
M.O.V.E Post-Processing: DT_1R4.1_B340
Legislation:

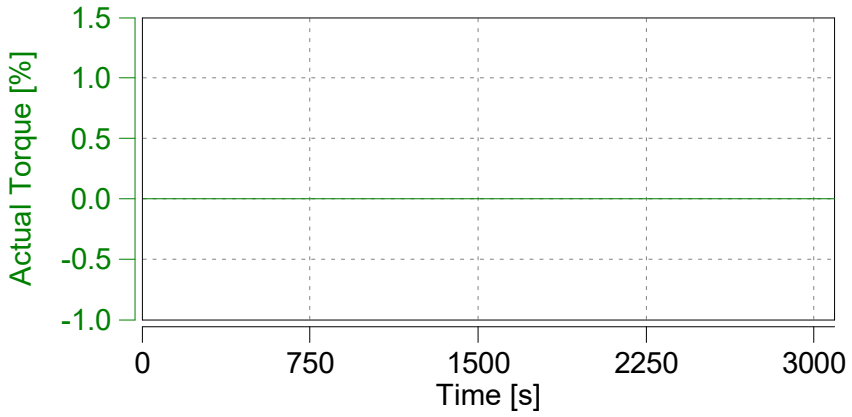
Vehicle: 213-20667 /
Engine: /
NOx Ambient Condition Corr.: 7 - CFR40 §1065.670
Dry / Wet Corr.: 2 - CFR40 §86.1342-90

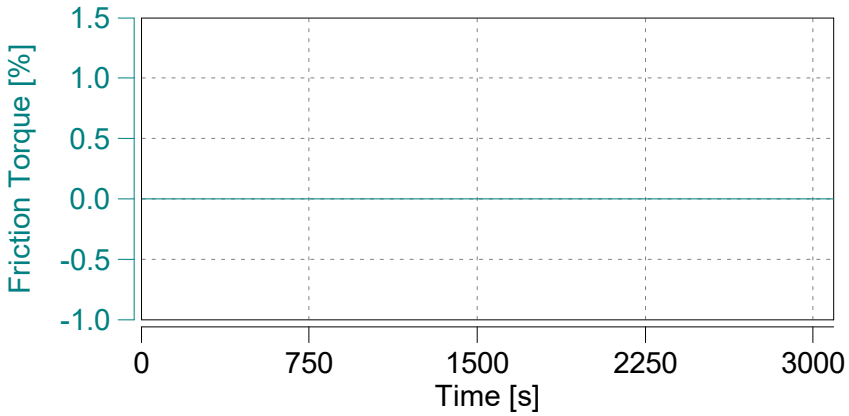
Case: 213-20667
Page: Engine (2)

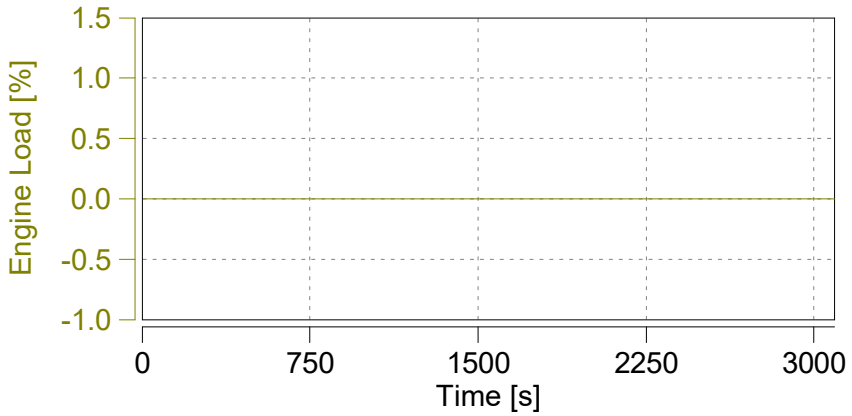
'213-20667 LA City'
Start Date: 04/11/2022
Start Time: 09:24:59.0

AVL
Concerto M.O.V.E, 2019







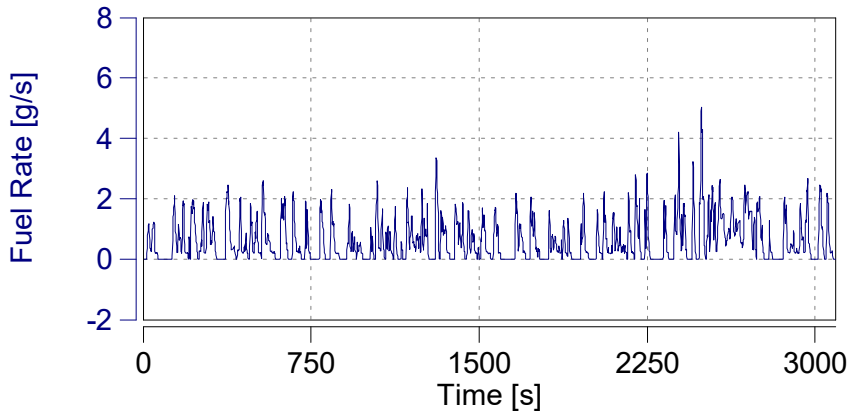


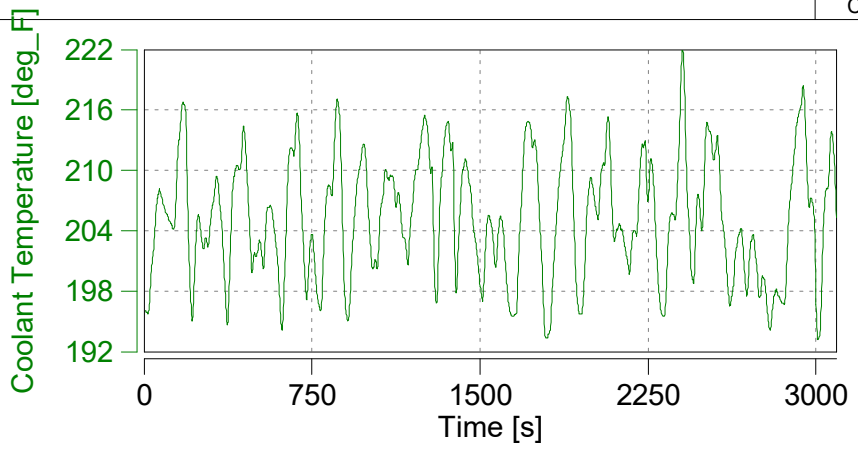
Concerto Version: 505 Build 171, Serial Number: 1604
M.O.V.E Post-Processing: DT_1R4.1_B340
Legislation:

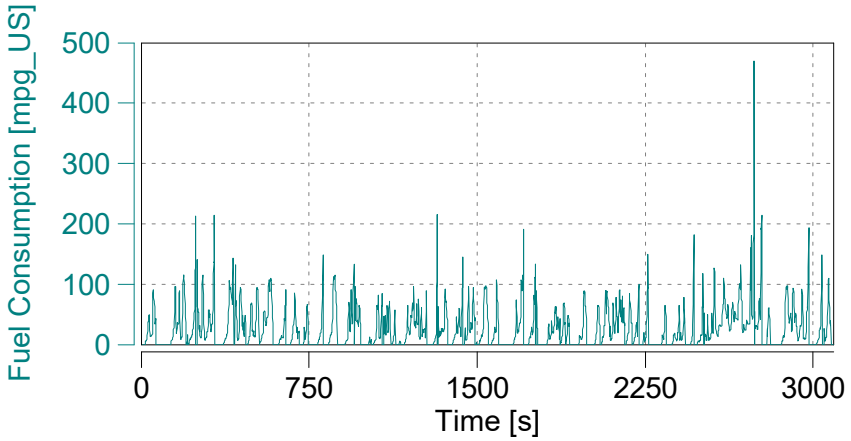
Vehicle: 213-20667 /
Engine: /
NOx Ambient Condition Corr.: 7 - CFR40 §1065.670
Dry / Wet Corr.: 2 - CFR40 §86.1342-90

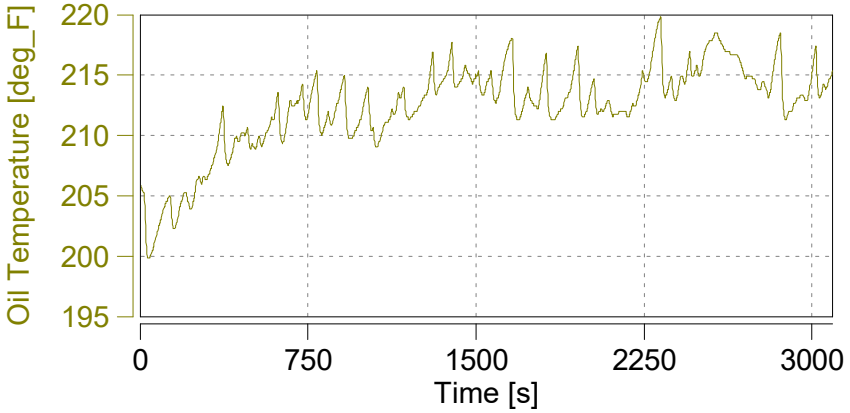
'213-20667 LA City'
Start Date: 04/11/2022
Start Time: 09:24:59.0

AVL
Concerto M.O.V.E, 2019









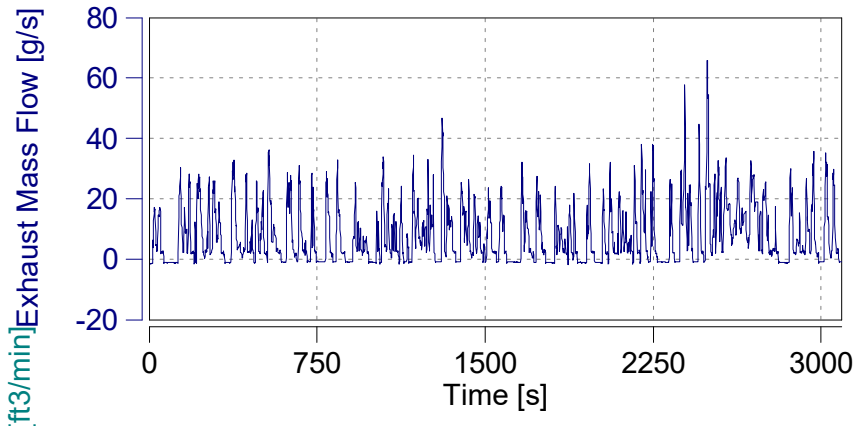
Concerto Version: 505 Build 171, Serial Number: 1604
M.O.V.E Post-Processing: DT_1R4.1_B340
Legislation:

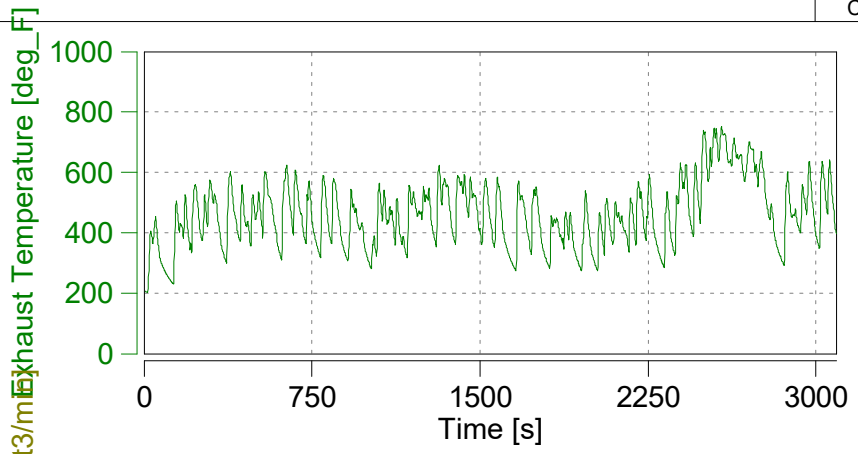
Vehicle: 213-20667 /
Engine: /
NOx Ambient Condition Corr.: 7 - CFR40 §1065.670
Dry / Wet Corr.: 2 - CFR40 §86.1342-90

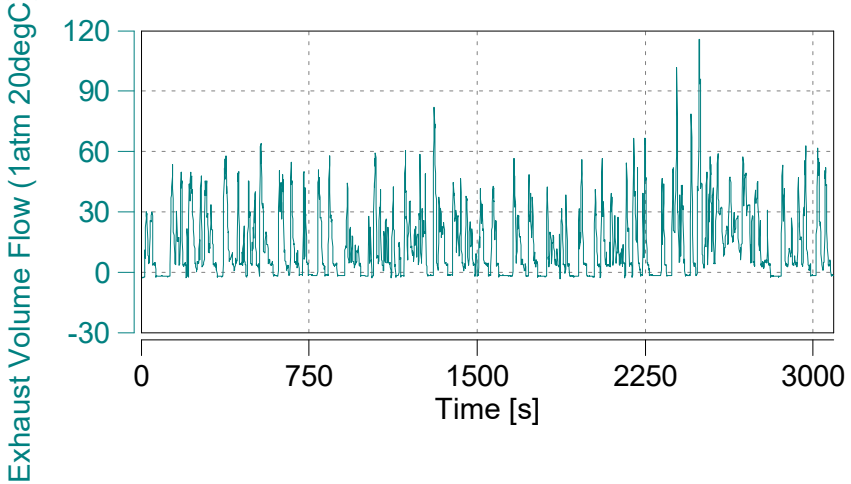
Case: 213-20667
Page: Exhaust Flow (1)

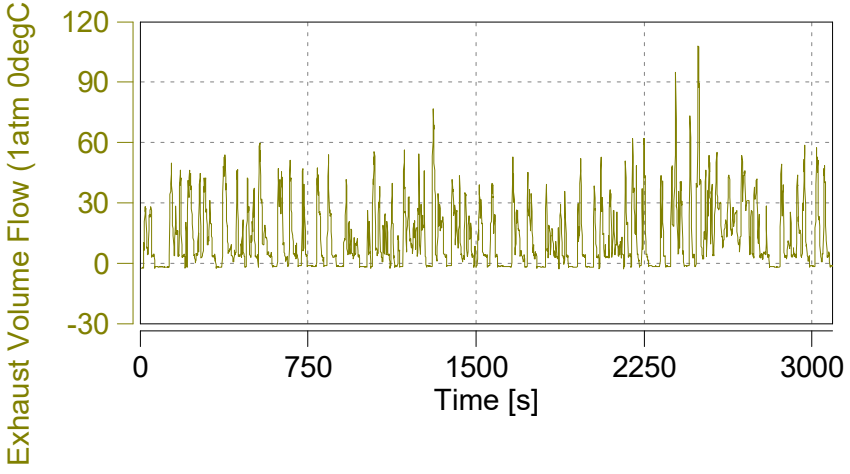
'213-20667 LA City'
Start Date: 04/11/2022
Start Time: 09:24:59.0

AVL
Concerto M.O.V.E, 2019









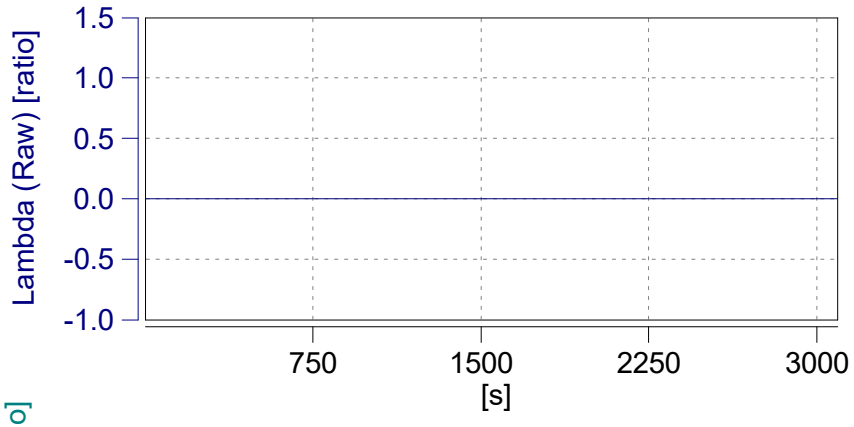
Concerto Version: 505 Build 171, Serial Number: 1604
M.O.V.E Post-Processing: DT_1R4.1_B340
Legislation:

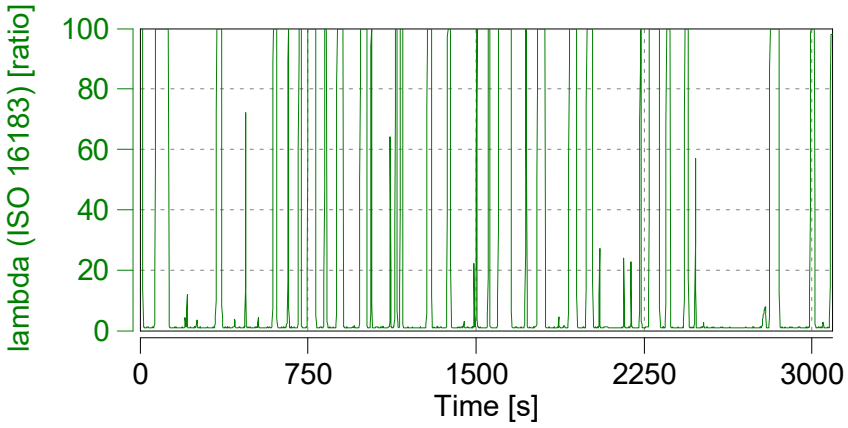
Vehicle: 213-20667 /
Engine: /
NOx Ambient Condition Corr.: 7 - CFR40 §1065.670
Dry / Wet Corr.: 2 - CFR40 §86.1342-90

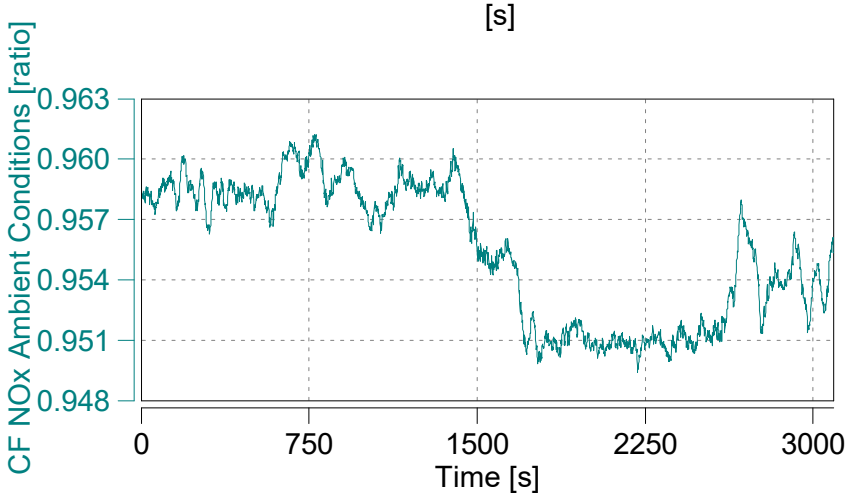
Case: 213-20667
Page: Exhaust Flow (2)

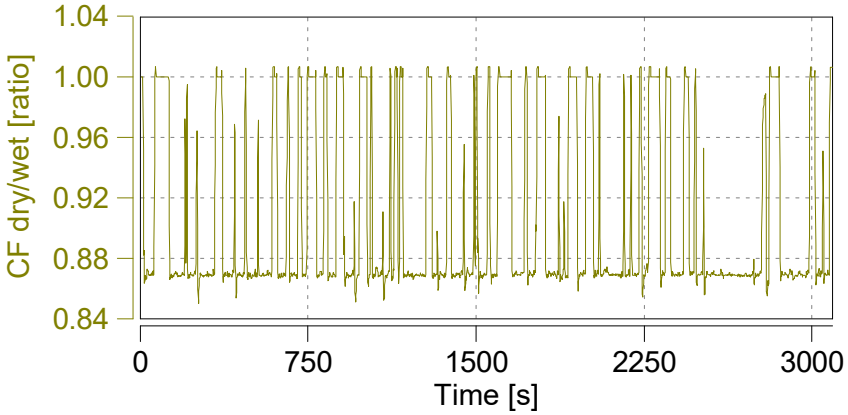
'213-20667 LA City'
Start Date: 04/11/2022
Start Time: 09:24:59.0

AVL
Concerto M.O.V.E, 2019









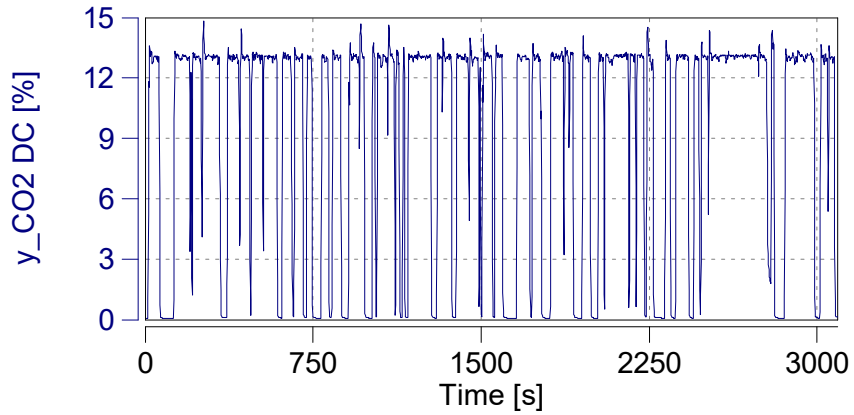
Concerto Version: 505 Build 171, Serial Number: 1604
M.O.V.E Post-Processing: DT_1R4.1_B340
Legislation:

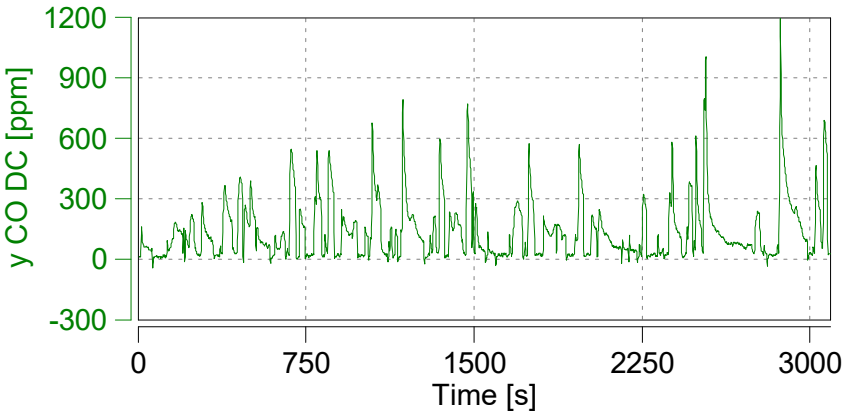
Vehicle: 213-20667 /
Engine: /
NOx Ambient Condition Corr.: 7 - CFR40 §1065.670
Dry / Wet Corr.: 2 - CFR40 §86.1342-90

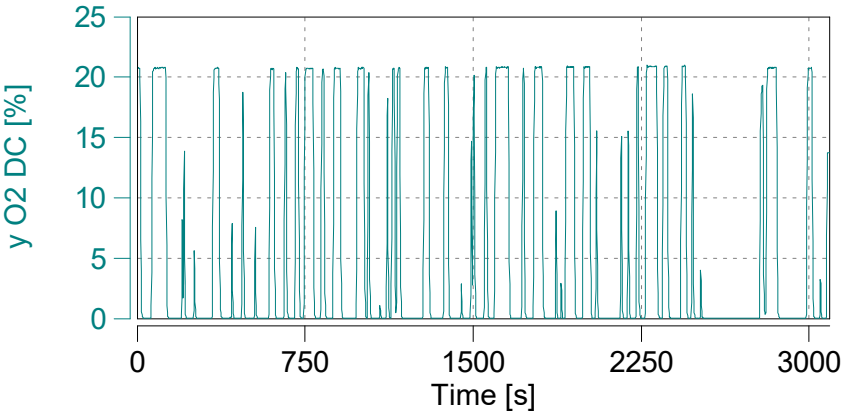
Case: 213-20667
Page: Corrected Emissions (1)

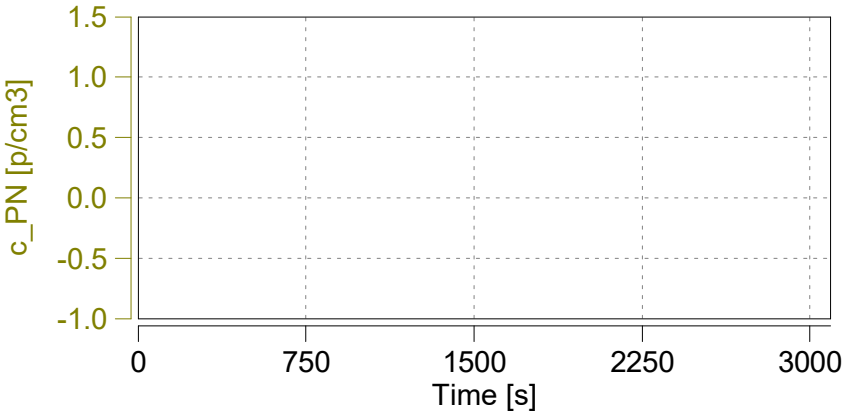
'213-20667 LA City'
Start Date: 04/11/2022
Start Time: 09:24:59.0

AVL
Concerto M.O.V.E, 2019









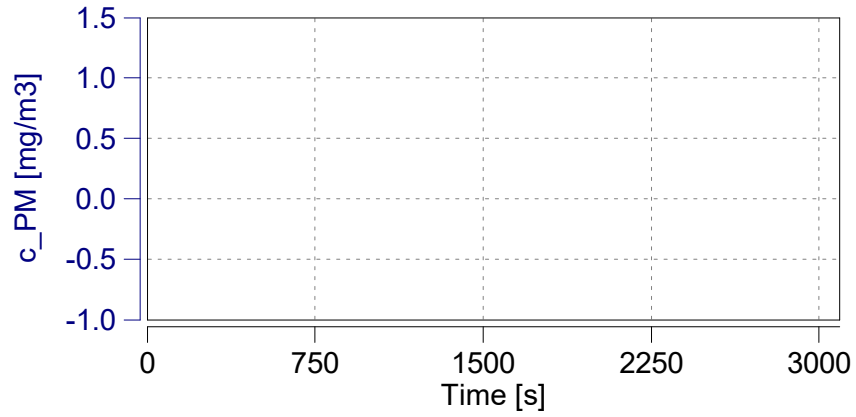
Concerto Version: 505 Build 171, Serial Number: 1604
M.O.V.E Post-Processing: DT_1R4.1_B340
Legislation:

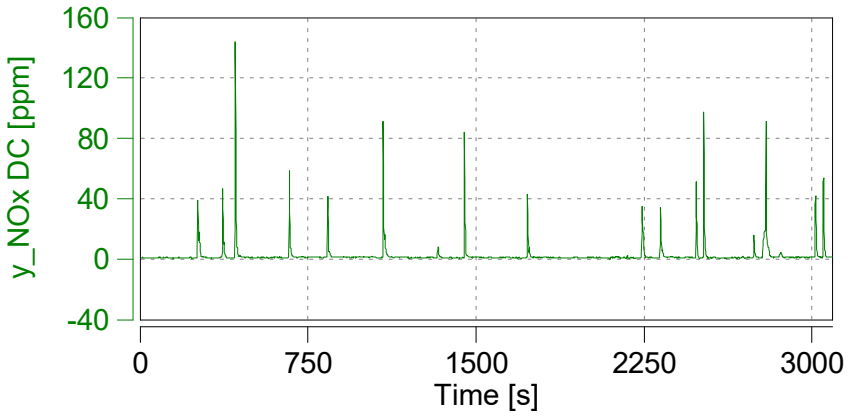
Vehicle: 213-20667 /
Engine: /
NOx Ambient Condition Corr.: 7 - CFR40 §1065.670
Dry / Wet Corr.: 2 - CFR40 §86.1342-90

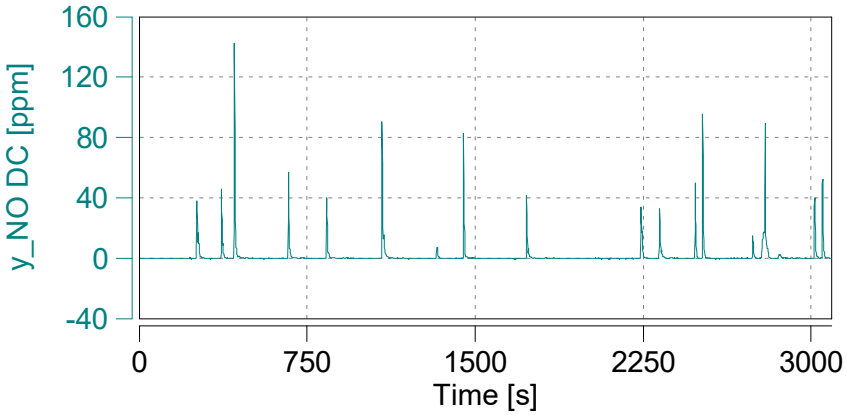
Case: 213-20667
Page: Corrected Emissions (2)

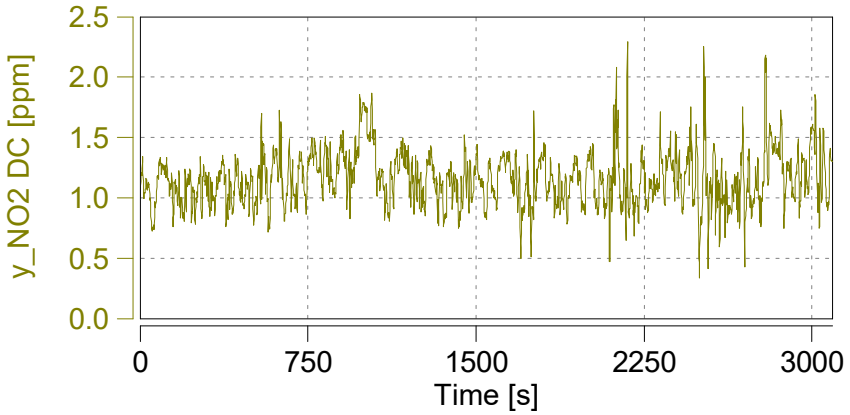
'213-20667 LA City'
Start Date: 04/11/2022
Start Time: 09:24:59.0

AVL
Concerto M.O.V.E, 2019









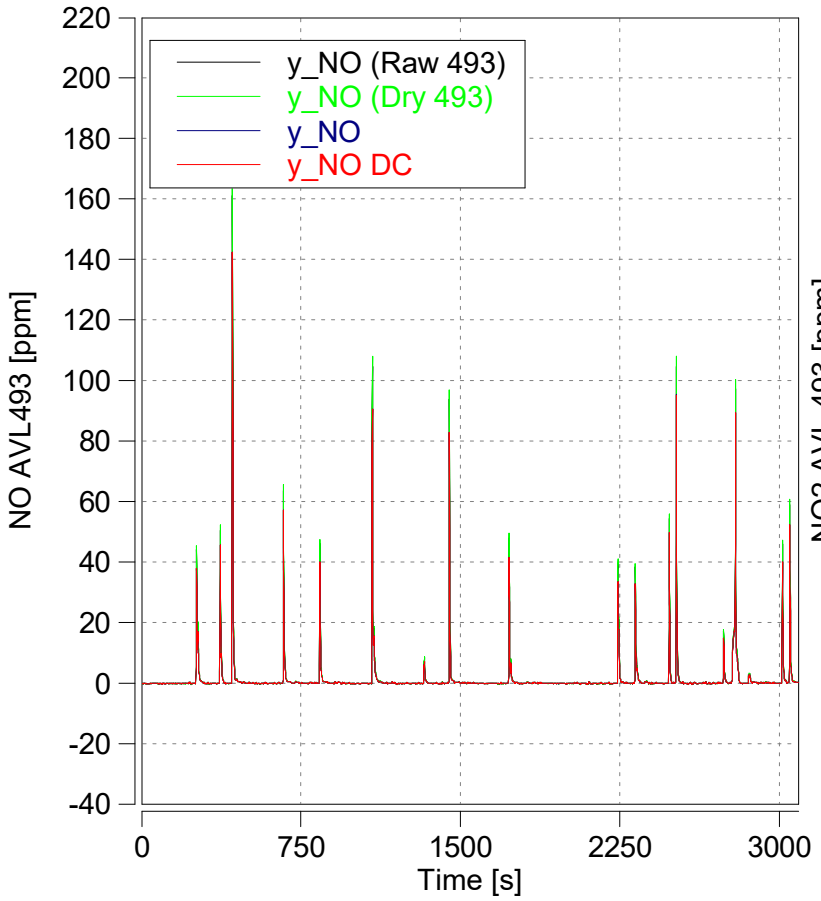
Concerto Version: 505 Build 171, Serial Number: 1604
M.O.V.E Post-Processing: DT_1R4.1_B340
Legislation:

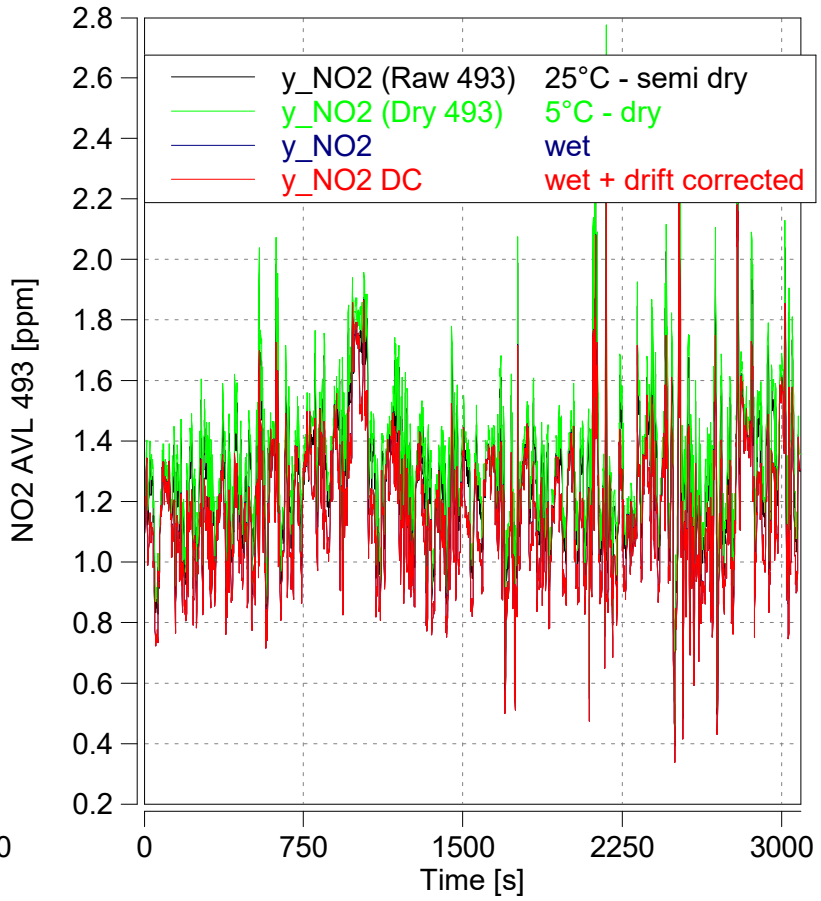
Vehicle: 213-20667 /
Engine: /
NOx Ambient Condition Corr.: 7 - CFR40 §1065.670
Dry / Wet Corr.: 2 - CFR40 §86.1342-90

Case: 213-20667
Page: Corrected Emissions (3)

'213-20667 LA City'
Start Date: 04/11/2022
Start Time: 09:24:59.0

AVL
Concerto M.O.V.E, 2019

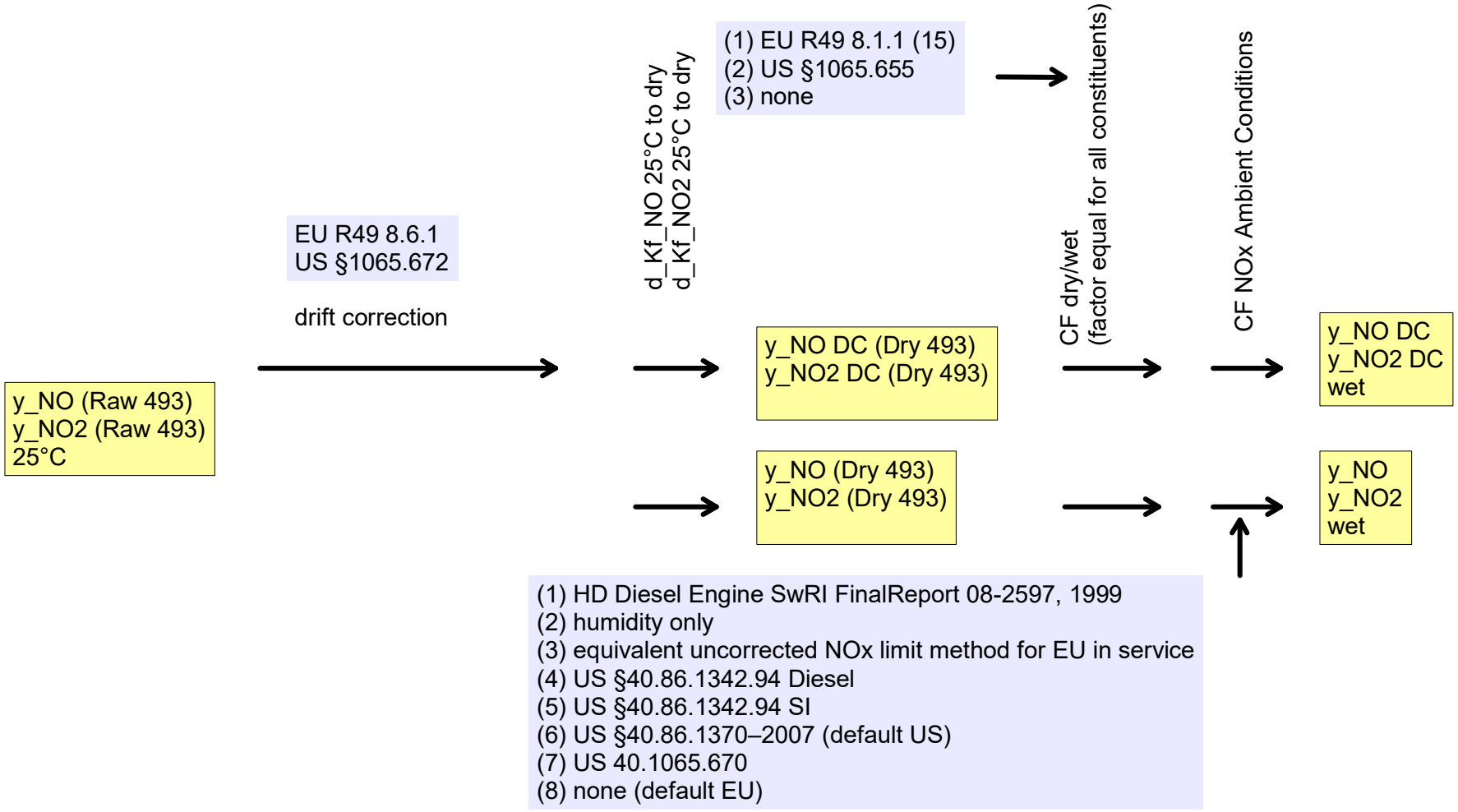




Concerto Version: 505 Build 171, Serial Number: 1604
M.O.V.E Post-Processing: DT_1R4.1_B340
Legislation:

Vehicle: 213-20667 /
Engine: /
NOx Ambient Condition Corr.: 7 - CFR40 §1065.670
Dry / Wet Corr.: 2 - CFR40 §86.1342-90

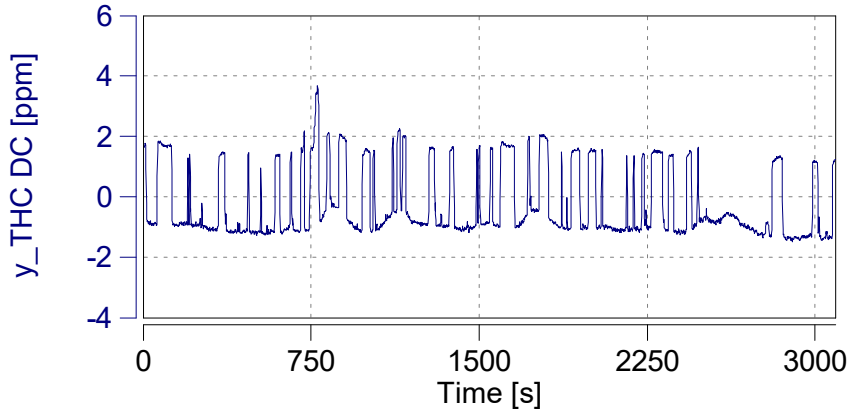
NOx - AVL 493

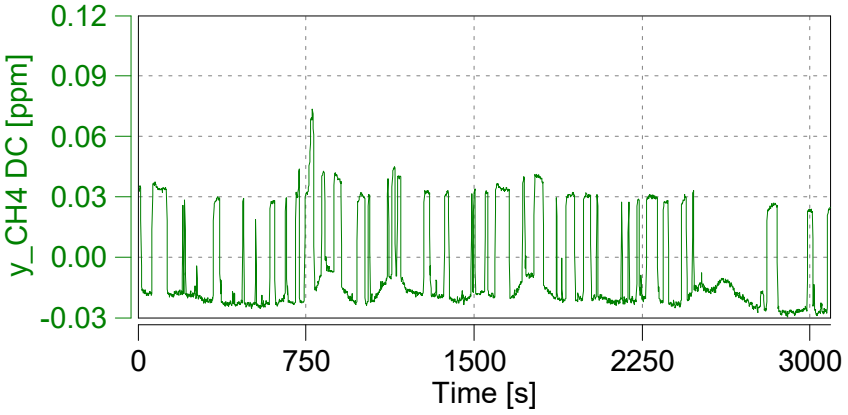

y_NO (Raw 493)
y_NO2 (Raw 493)
25°C
EU R49 8.6.1
US §1065.672
drift correction
d_Kf_NO 25°C to dry
d_Kf_NO2 25°C to dry
(1) EU R49 8.1.1 (15)
(2) US §1065.655
(3) none
y_NO DC (Dry 493)
y_NO2 DC (Dry 493)
y_NO (Dry 493)
y_NO2 (Dry 493)
CF dry/wet
(factor equal for all constituents)
CF NOx Ambient Conditions
y_NO DC
y_NO2 DC
wet
y_NO
y_NO2
wet
(1) HD Diesel Engine SwRI FinalReport 08-2597, 1999
(2) humidity only
(3) equivalent uncorrected NOx limit method for EU in service
(4) US §40.86.1342.94 Diesel
(5) US §40.86.1342.94 SI
(6) US §40.86.1370–2007 (default US)
(7) US 40.1065.670
(8) none (default EU)

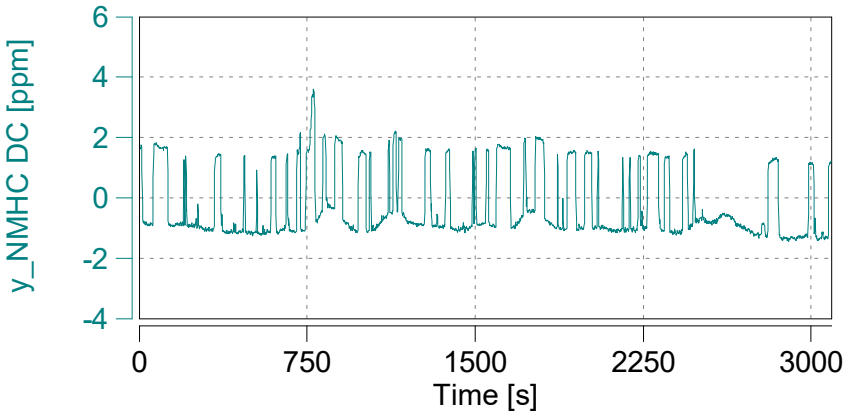
Case: 213-20667
Page: Corrected Emissions (5)

'213-20667 LA City'
Start Date: 04/11/2022
Start Time: 09:24:59.0

AVL
Concerto M.O.V.E, 2019







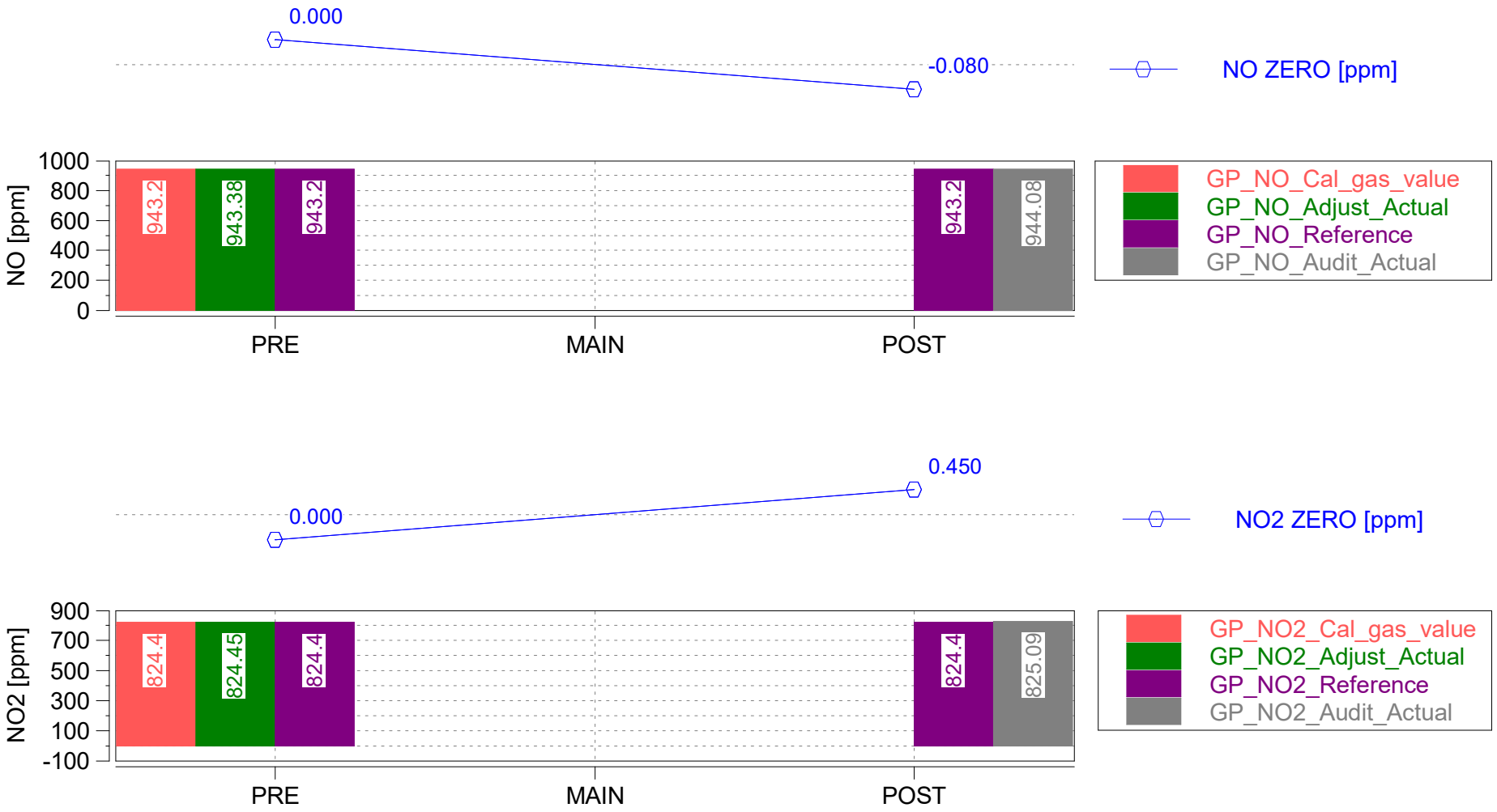
Concerto Version: 505 Build 171, Serial Number: 1604
M.O.V.E Post-Processing: DT_1R4.1_B340
Legislation:

Vehicle: 213-20667 /
Engine: /
NOx Ambient Condition Corr.: 7 - CFR40 §1065.670
Dry / Wet Corr.: 2 - CFR40 §86.1342-90

Case: 213-20667
Page: NO/NO2/NOx Zero - Span

'213-20667 LA City'
Start Date: 04/11/2022
Start Time: 09:24:59.0

AVL
Concerto M.O.V.E, 2019



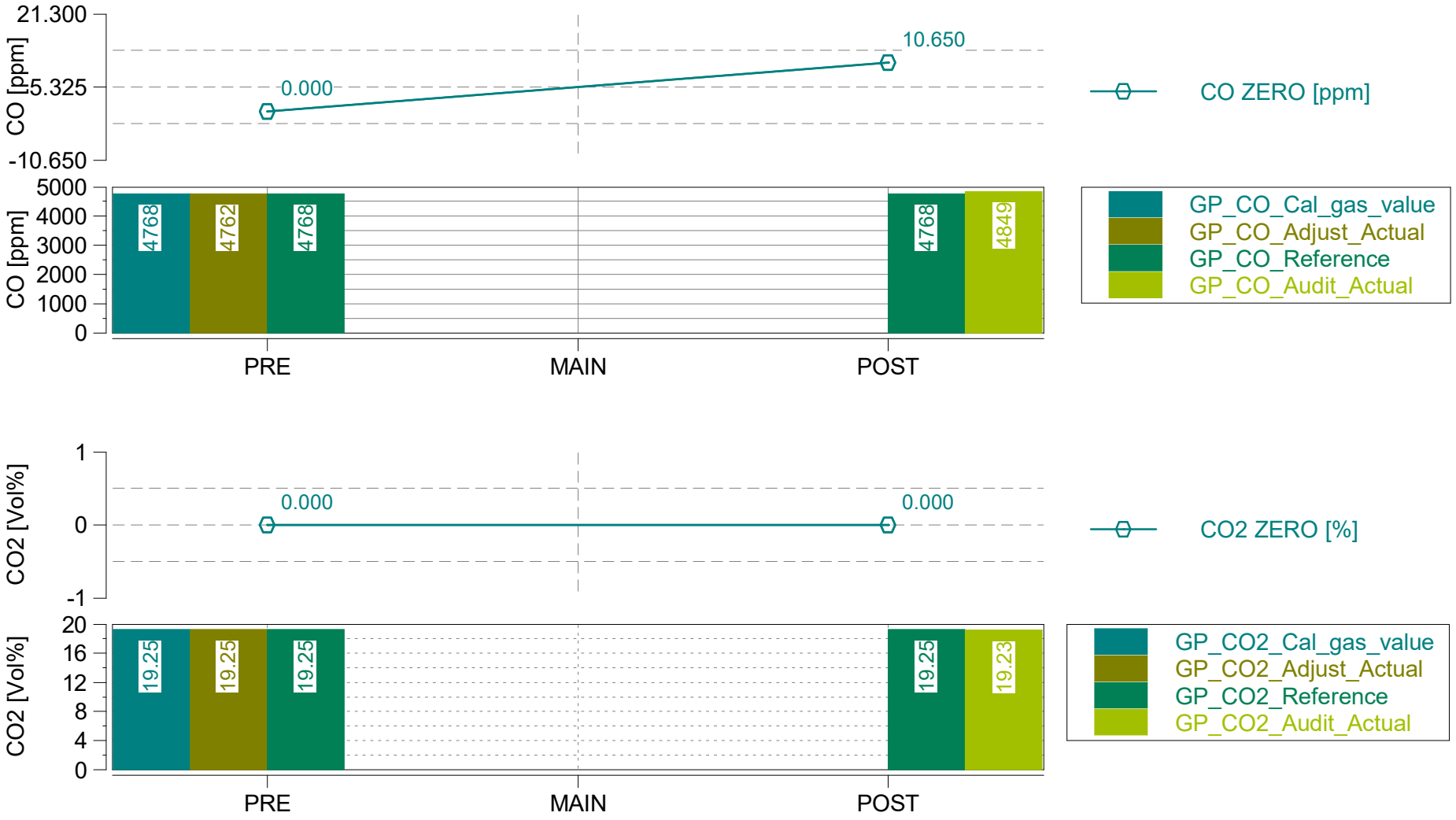
Concerto Version: 505 Build 171, Serial Number: 1604
M.O.V.E Post-Processing: DT_1R4.1_B340
Legislation:

Vehicle: 213-20667 /
Engine: /
NOx Ambient Condition Corr.: 7 - CFR40 §1065.670
Dry / Wet Corr.: 2 - CFR40 §86.1342-90

Case: 213-20667
Page: CO/CO2 Zero - Span

'213-20667 LA City'
Start Date: 04/11/2022
Start Time: 09:24:59.0

AVL
Concerto M.O.V.E, 2019



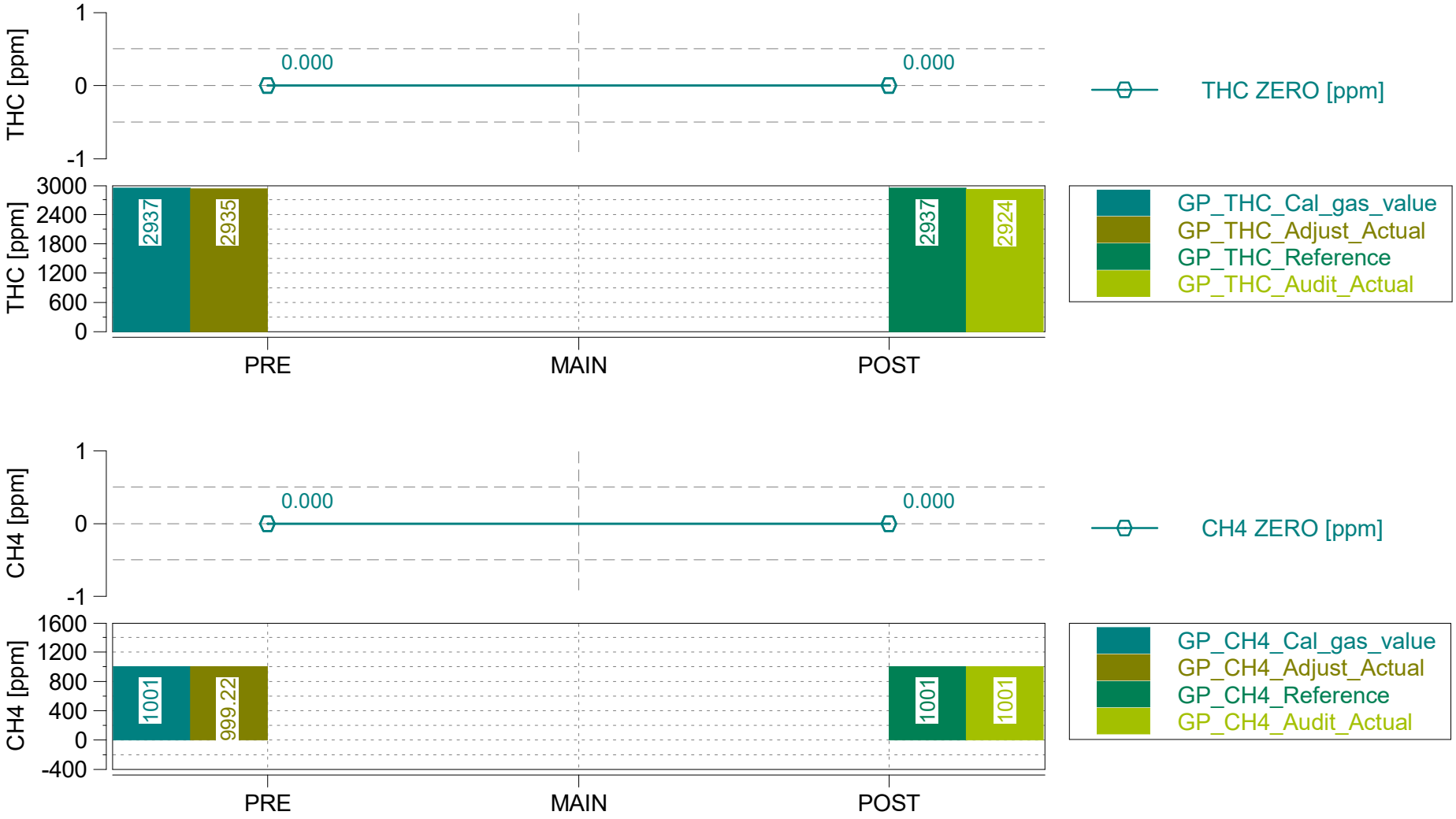
Concerto Version: 505 Build 171, Serial Number: 1604
M.O.V.E Post-Processing: DT_1R4.1_B340
Legislation:

Vehicle: 213-20667 /
Engine: /
NOx Ambient Condition Corr.: 7 - CFR40 §1065.670
Dry / Wet Corr.: 2 - CFR40 §86.1342-90

Case: 213-20667
Page: THC/CH4 Zero - Span

'213-20667 LA City'
Start Date: 04/11/2022
Start Time: 09:24:59.0

AVL
Concerto M.O.V.E, 2019



Concerto Version: 505 Build 171, Serial Number: 1604
M.O.V.E Post-Processing: DT_1R4.1_B340
Legislation:

Vehicle: 213-20667 /
Engine: /
NOx Ambient Condition Corr.: 7 - CFR40 §1065.670
Dry / Wet Corr.: 2 - CFR40 §86.1342-90

§	criterium	condition	value	unit	pass/fail
GAS Leak Check	The leakage rate on the vacuum side shall not exceed 0.5 per cent of the in-use flow rate for the portion of the system being checked.	The leakage rate <= 0.5%	**0.09**	**%**	pass
PN Leak Check	n/a	n/a	**n/a**	**n/a**	n/a
PM Leak Check	n/a	n/a	**n/a**	**n/a**	n/a

GAS PEMS Devices

Device ID	AVL492
Serial Number	0625
Firmware Version	V1.17
Main Test Date	2022-04-11
Leak Check Age [days]	0

Device ID	AVL4925iS
Serial Number	184
Firmware Version	1.22.0.4

EFM

Device ID	AVL495
Serial Number	00826
Serial Number Tube	01080
Firmware Version	V1.16

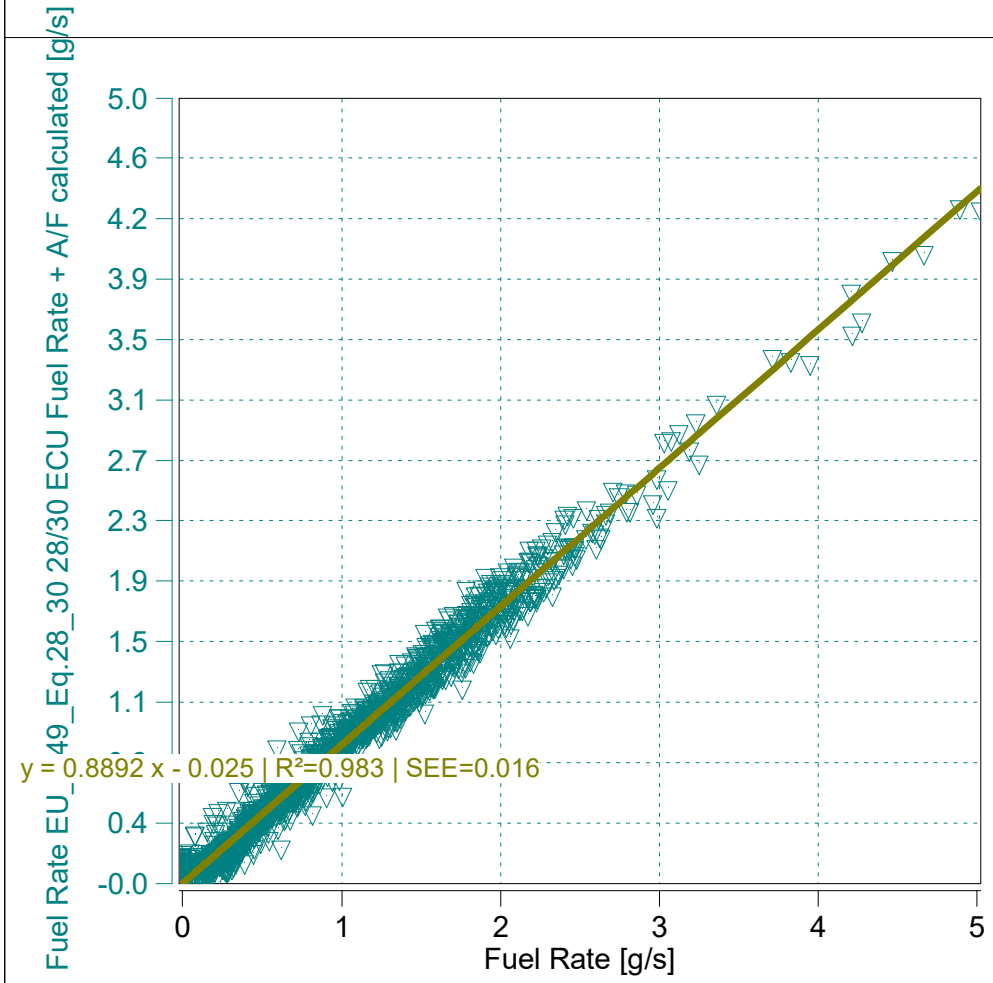
System Control

SC Version	V2.9_237
SC Serial Number	60300923

Case: 213-20667
Page: Fuel Rate ECU vs. Calculated

'213-20667 LA City'
Start Date: 04/11/2022
Start Time: 09:24:59.0

AVL
Concerto M.O.V.E, 2019



EU 582/2011/Appendix I/3.2.1 | Fuel Rate ECU and calculated

y = 0.8892 x - 0.025 | R²=0.983 | SEE=0.016
m = 0.89 (0.9 - 1.1 recommended)
R² = 0.98 (min 0.9 mandatory)

Data from - to [% of Maximum]

0 100

Concerto Version: 505 Build 171, Serial Number: 1604
M.O.V.E Post-Processing: DT_1R4.1_B340
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