Mercedes-Benz MY2022 Metris PEMS Report

1. Background

Daimler AG, with headquarters in Stuttgart, Germany, is a large automotive company that sells vehicles and services in nearly every country in the world. Daimler 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, Daimler 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, Daimler 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 MY2022 Metris from Test Group NMBXT02.0U3B, which is the third highest volume Test Group applicable for MY2022 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 Daimler AG's and Mercedes-Benz AG'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

MY2022 vehicle with the specifications listed in Table 1 was tested in May 2021. Tables 2 through 4 provide the vehicle test results of the combined route segments performed in the default transmission mode (Comfort Mode).

Table 1: Vehicle Specification

Model	Tier	Drive type	HP	Torque (ft.lb)	Transmission	Exh Treatment	Fuel	Start Mileage
Metris	ULEV50	RWD	208	258	9 - AT	TWC	Gasoline	230

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**
Metris	318.94	0.19783	0.00156	0.00713	0.00178	305.44	0.10539	0.00080	0.02697	0.00135

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**
Metris	623.38	0.48257	0.02147	0.01722	0.02133	238.76	0.04438	0.00630	0.02024	0.00662

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**
Metris	334.30	0.25697	0.01113	0.06253	0.01026	549.98	0.10052	0.00112	0.00920	0.00206

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)
0.30.23	27.84	13.567	54.98	5.32	0.45	48.82	45.42	419	70.89

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)
0.38.52	28.49	13.978	43.98	6.90	0.26	50.09	42.75	215	77.94

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)
0.31.26	17.14	13.982	32.72	6.20	0.00	49.15	44.65	1016	74.58

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)
0.31.02	18.12	16.287	35.02	13.75	0.05	45.70	40.49	87	76.55

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)
0.30.22	24.20	12.781	47.81	6.53	0.44	47.56	45.45	232	66.57

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)
0.54.42	15.91	13.845	17.45	24.35	0.00	39.24	36.41	278	80.12

‡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.

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	30 min	129	48	83	17
A1	28	30 min	283	55	91	9
A2	17	31 min	971	29	0	100
B1	18	31 min	990	35	16	84
B2	28	39 min	295	44	64	36
LA City	16	54 min	73	17	13	87

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 938ft (286m).

A1 – Highway East

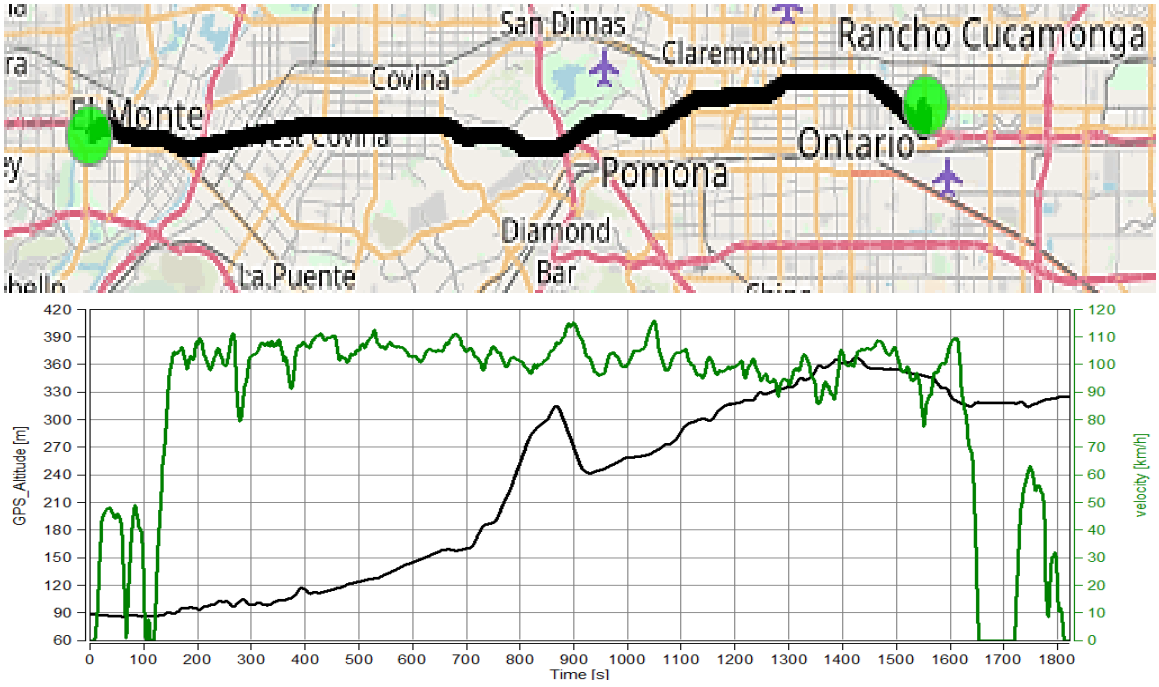


Figure 1. Map of Route A1 – Highway East. Including speed and elevation

B2 – Highway West

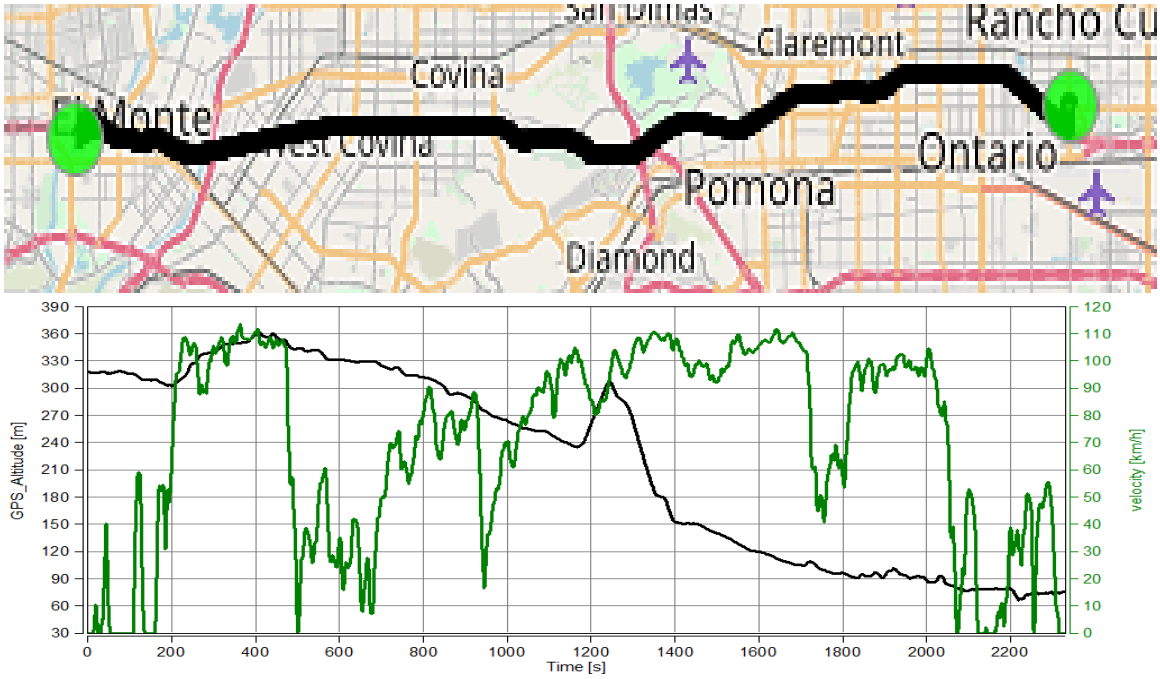


Figure 2. Map of Route B2 – Highway West. Including speed and elevation

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

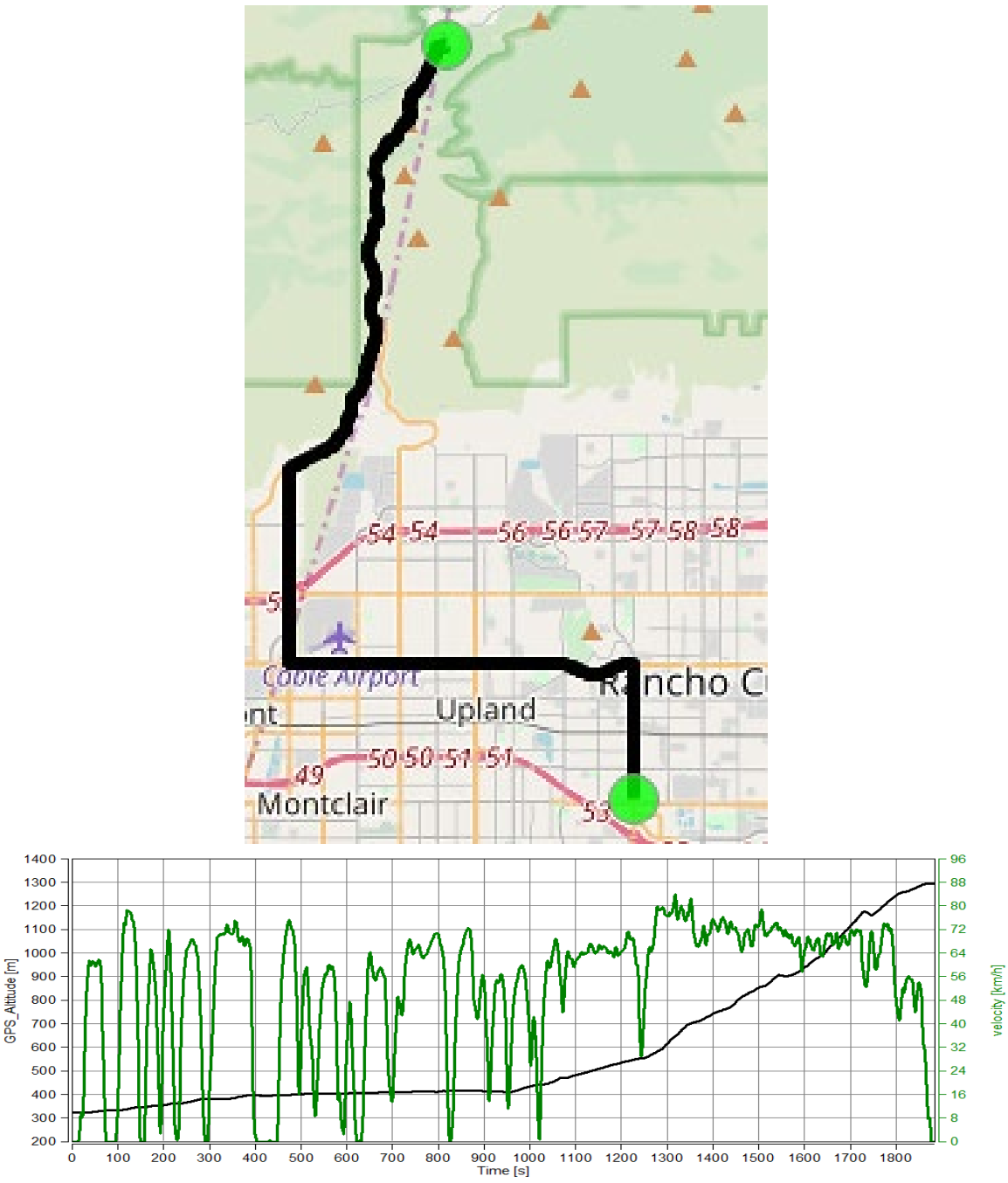


Figure 3. Map of Route A2 – Mountain Uphill. Including speed and elevation

B1 – Mountain Downhill.

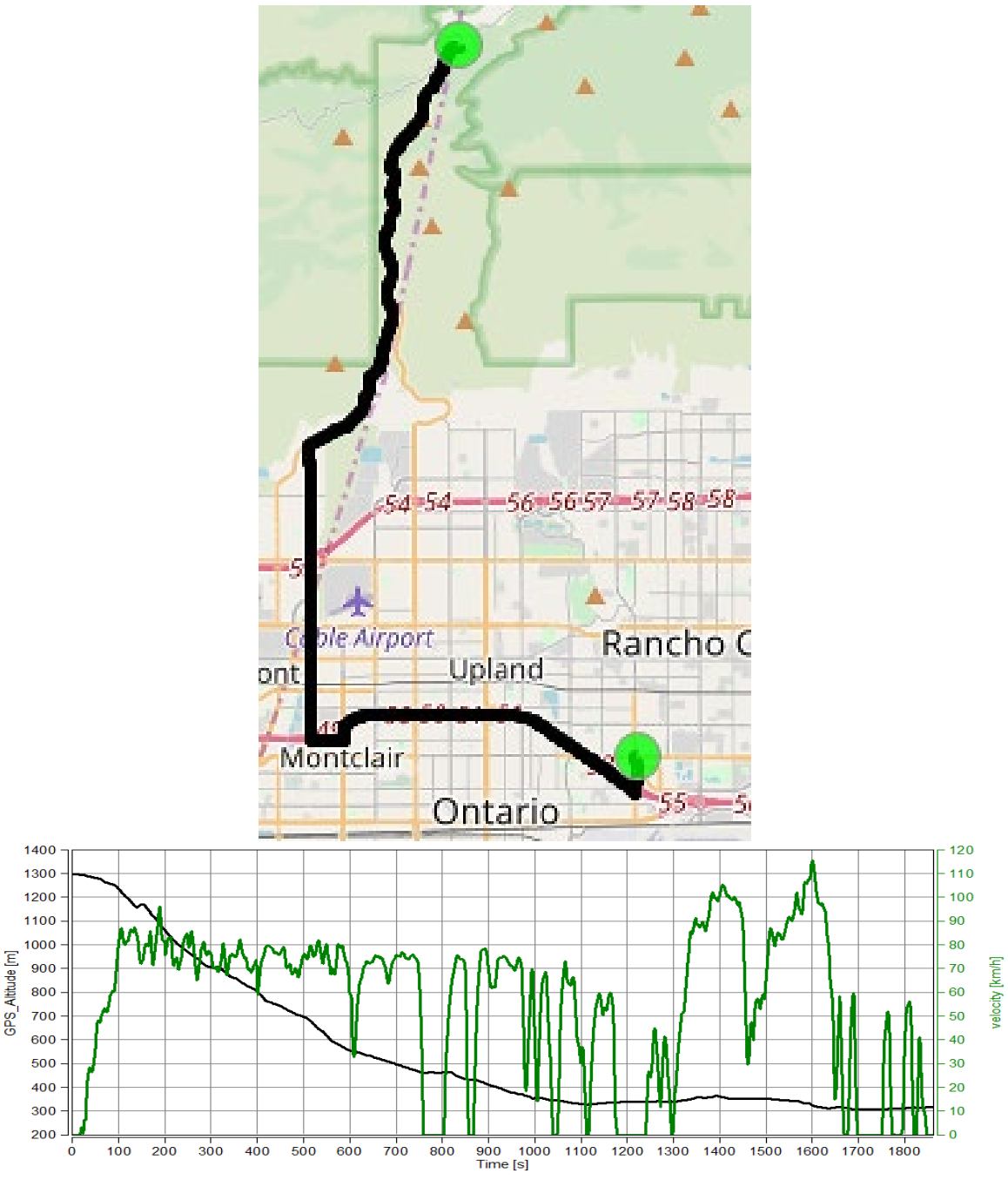


Figure 4. Map of Route B1 – Mountain Downhill. Including speed and elevation

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

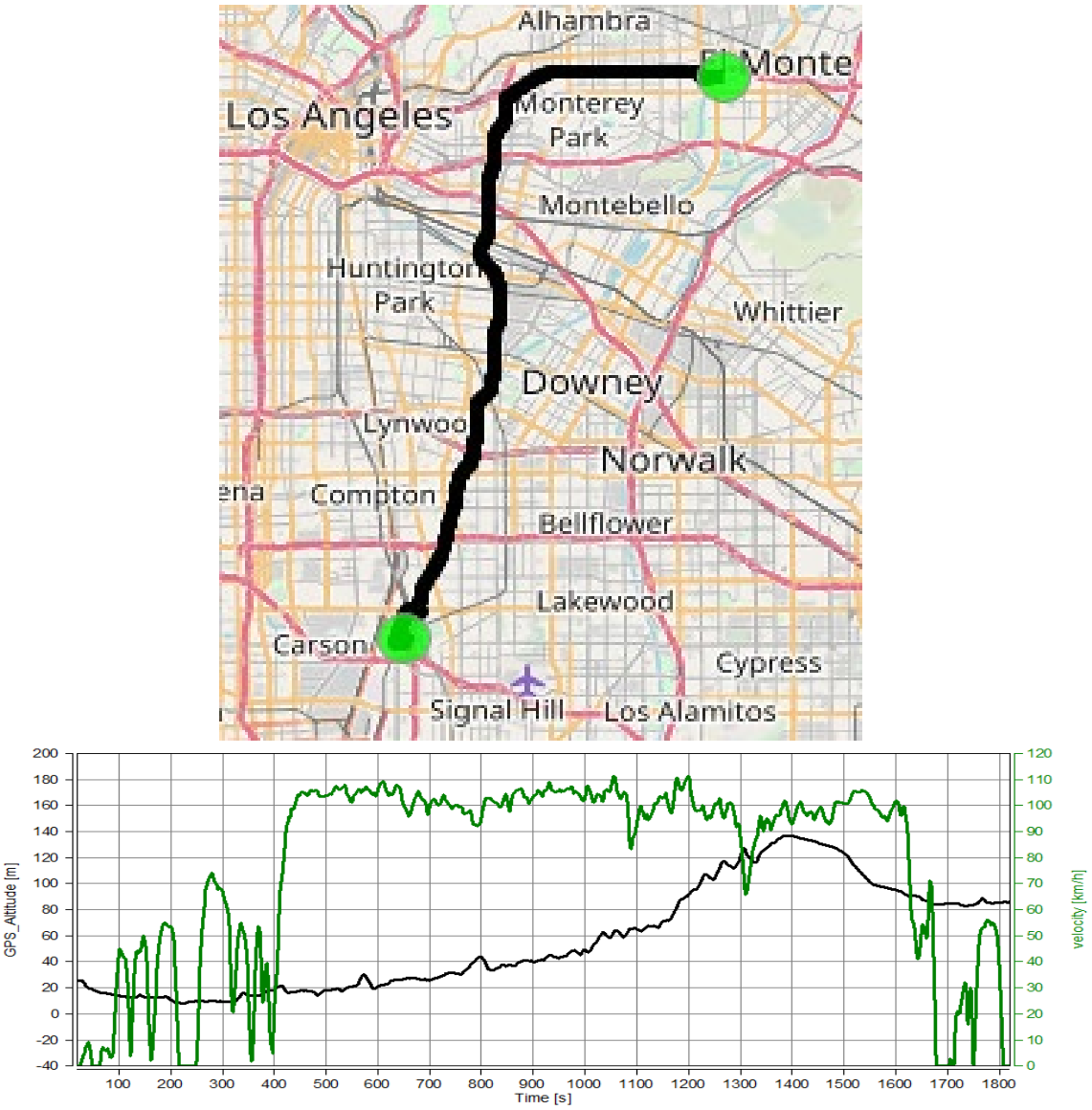


Figure 5. Map of Route A0 – Long Beach to CARB, El Monte. Including speed and elevation

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

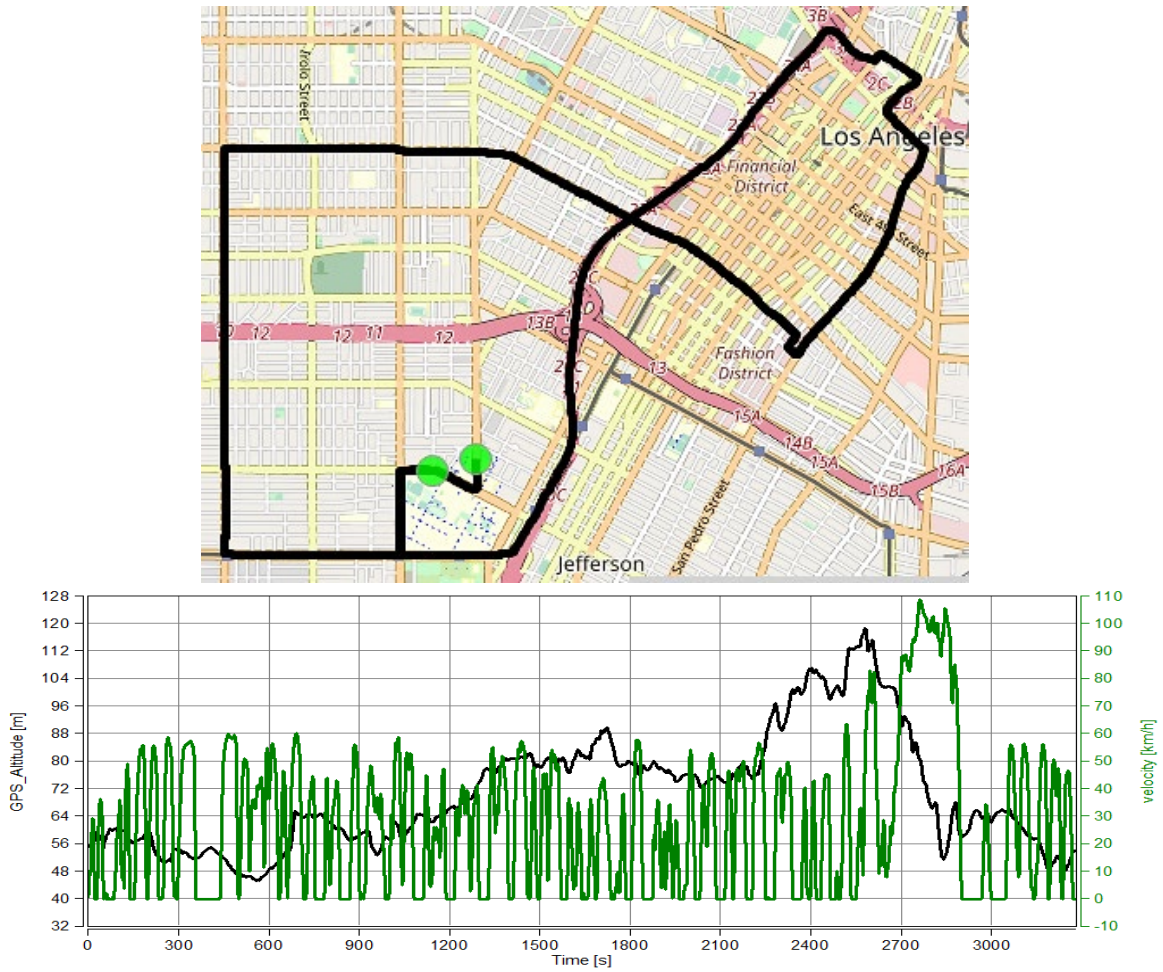


Figure 6. Map of LA City Route. Including speed and elevation

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_Metris 1-June-2021.pdf

This file contains log sheet information on PEMS testing conducted with the MY2022 Mercedes-Benz Metris test vehicle L447-2128. 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: L447-2128
Page: Trip Summary

'A1 HWY EAST'
Start Date: 05/13/2021
Start Time: 09:07:53.0

AVL
Concerto M.O.V.E, 2019

Trip Duration	1823.00	s
Trip Duration (a)	1823.00	s
Trip Distance	27.84	mi
Trip Distance (a)	27.84	mi
Trip Fuel Cons. (b)	3.04	kg
Trip Fuel Cons. (ab)	3.04	kg
Trip Fuel Cons. EU (ac)	2.95	kg
Trip Fuel Cons. US (ac)	2.92	kg
Trip Fuel Economy (b)	25.93	mpg_US
Trip Fuel Economy (ab)	25.93	mpg_US
Trip Fuel Economy EU (ac)	26.74	mpg_US
Trip Fuel Economy US (ac)	26.97	mpg_US
Trip Fuel Economy GGE (b)	25.93	mpg_US
Trip Fuel Economy GGE (ab)	25.93	mpg_US
Trip Fuel Economy EU GGE (ac)	26.74	mpg_US
Trip Fuel Economy US GGE (ac)	26.97	mpg_US
Trip Av. Eng. Speed	1751.00	rpm
Trip Av. Torque	93.77	lbft
Trip Av. Power	33.38	hp
Trip Work		
Trip Work (a)	16.90	hphr
Trip Exhaust Mass	45.16	kg
Trip Exhaust Mass EU (ac)	46.28	kg
Trip Exhaust Mass US (ac)	46.69	kg
Trip Av. Amb. Temperature	70.89	deg_F
Trip Av. Humidity	56.56	%
Trip Av. GPS Altitude	230.29	m
Fuel Type	Petrol (E10)	

ave THC	1.32696	ppm
ave NMHC	2.19317	ppm
ave CH4	-0.86620	ppm
ave CO	107.86214	ppm
ave CO2	12.52740	%
ave NOx	3.07223	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	0.04233	g
tot NMHC	0.04821	g
tot CH4	0.00466	g
tot CO	5.50376	g
tot CO2	8886.67819	g
tot NO (d)	0.14547	g
tot NO2	0.05346	g
tot NOx	0.19839	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	54.97964	mi/hr
Trip Distance Share Urban	4.28432	% distance
Trip Distance Share Rural	4.99734	% distance
Trip Distance Share Motorway	90.71834	% distance

BS CO2	525.72285	g/hphr
BS CO	0.32559	g/hphr
BS THC	0.00250	g/hphr
BS NMHC	0.00285	g/hphr
BS CH4	0.00028	g/hphr
BS NO (d)	0.00861	g/hphr
BS NO2	0.00316	g/hphr
BS NOx	0.01174	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	319.19300	g/mi
DS CO	0.19769	g/mi
DS THC	0.00152	g/mi
DS NMHC	0.00173	g/mi
DS CH4	0.00017	g/mi
DS NO (d)	0.00523	g/mi
DS NO2	0.00192	g/mi
DS NOx	0.00713	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	2925.03761	g/kg
FS CO	1.81156	g/kg
FS THC	0.01393	g/kg
FS NMHC	0.01587	g/kg
FS CH4	0.00153	g/kg
FS NO (d)	0.04788	g/kg
FS NO2	0.01759	g/kg
FS NOx	0.06530	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: 504 Build 119, Serial Number: 1604
M.O.V.E Post-Processing: DT_1R4.1_B340
Legislation:

Vehicle: L447-2128 /
Engine: /
NOx Ambient Condition Corr.: 7 - CFR40 §1065.670
Dry / Wet Corr.: 2 - CFR40 §86.1342-90

Case: L447-2128
Page: Trip Summary Drift Corrected

'A1 HWY EAST'
Start Date: 05/13/2021
Start Time: 09:07:53.0

AVL
Concerto M.O.V.E, 2019

Trip Duration	1823.00	s
Trip Duration (a)	1823.00	s
Trip Distance	27.84	mi
Trip Distance (a)	27.84	mi
Trip Fuel Cons. (b)	3.04	kg
Trip Fuel Cons. (ab)	3.04	kg
Trip Fuel Cons. EU (ac)	2.95	kg
Trip Fuel Cons. US (ac)	2.92	kg
Trip Fuel Economy (b)	25.93	mpg_US
Trip Fuel Economy (ab)	25.93	mpg_US
Trip Fuel Economy EU (ac)	26.74	mpg_US
Trip Fuel Economy US (ac)	26.97	mpg_US
Trip Fuel Economy GGE (b)	25.93	mpg_US
Trip Fuel Economy GGE (ab)	25.93	mpg_US
Trip Fuel Economy EU GGE (ac)	26.74	mpg_US
Trip Fuel Economy US GGE (ac)	26.97	mpg_US
Trip Av. Eng. Speed	1751.00	rpm
Trip Av. Torque	93.77	lbft
Trip Av. Power	33.38	hp
Trip Work		
Trip Work (a)	16.90	hphr
Trip Exhaust Mass	45.16	kg
Trip Exhaust Mass EU (ac)	46.28	kg
Trip Exhaust Mass US (ac)	46.69	kg
Trip Av. Amb. Temperature	70.89	deg_F
Trip Av. Humidity	56.56	%
Trip Av. GPS Altitude	230.29	m
Fuel Type	Petrol (E10)	

ave THC DC	1.39756	ppm
ave NMHC DC	2.19574	ppm
ave CH4 DC	-0.79818	ppm
ave CO DC	107.94175	ppm
ave CO2 DC	12.51754	%
ave NOx DC	3.07351	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	0.04337	g
tot NMHC DC	0.04826	g
tot CH4 DC	0.00498	g
tot CO DC	5.50783	g
tot CO2 DC	8879.67897	g
tot NO DC (d)	0.14553	g
tot NO2 DC	0.05348	g
tot NOx DC	0.19847	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	54.97964	mi/hr
Trip Distance Share Urban	4.28432	% distance
Trip Distance Share Rural	4.99734	% distance
Trip Distance Share Motorway	90.71834	% distance

BS CO2 DC	525.30879	g/hphr
BS CO DC	0.32583	g/hphr
BS THC DC	0.00257	g/hphr
BS NMHC DC	0.00285	g/hphr
BS CH4 DC	0.00029	g/hphr
BS NO DC (d)	0.00861	g/hphr
BS NO2 DC	0.00316	g/hphr
BS NOx DC	0.01174	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	318.94160	g/mi
DS CO DC	0.19783	g/mi
DS THC DC	0.00156	g/mi
DS NMHC DC	0.00173	g/mi
DS CH4 DC	0.00018	g/mi
DS NO DC (d)	0.00523	g/mi
DS NO2 DC	0.00192	g/mi
DS NOx DC	0.00713	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	2922.73382	g/kg
FS CO DC	1.81289	g/kg
FS THC DC	0.01428	g/kg
FS NMHC DC	0.01588	g/kg
FS CH4 DC	0.00164	g/kg
FS NO DC (d)	0.04790	g/kg
FS NO2 DC	0.01760	g/kg
FS NOx DC	0.06533	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

Case: L447-2128
Page: Time Alignment Check

'A1 HWY EAST'
Start Date: 05/13/2021
Start Time: 09:07:53.0

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

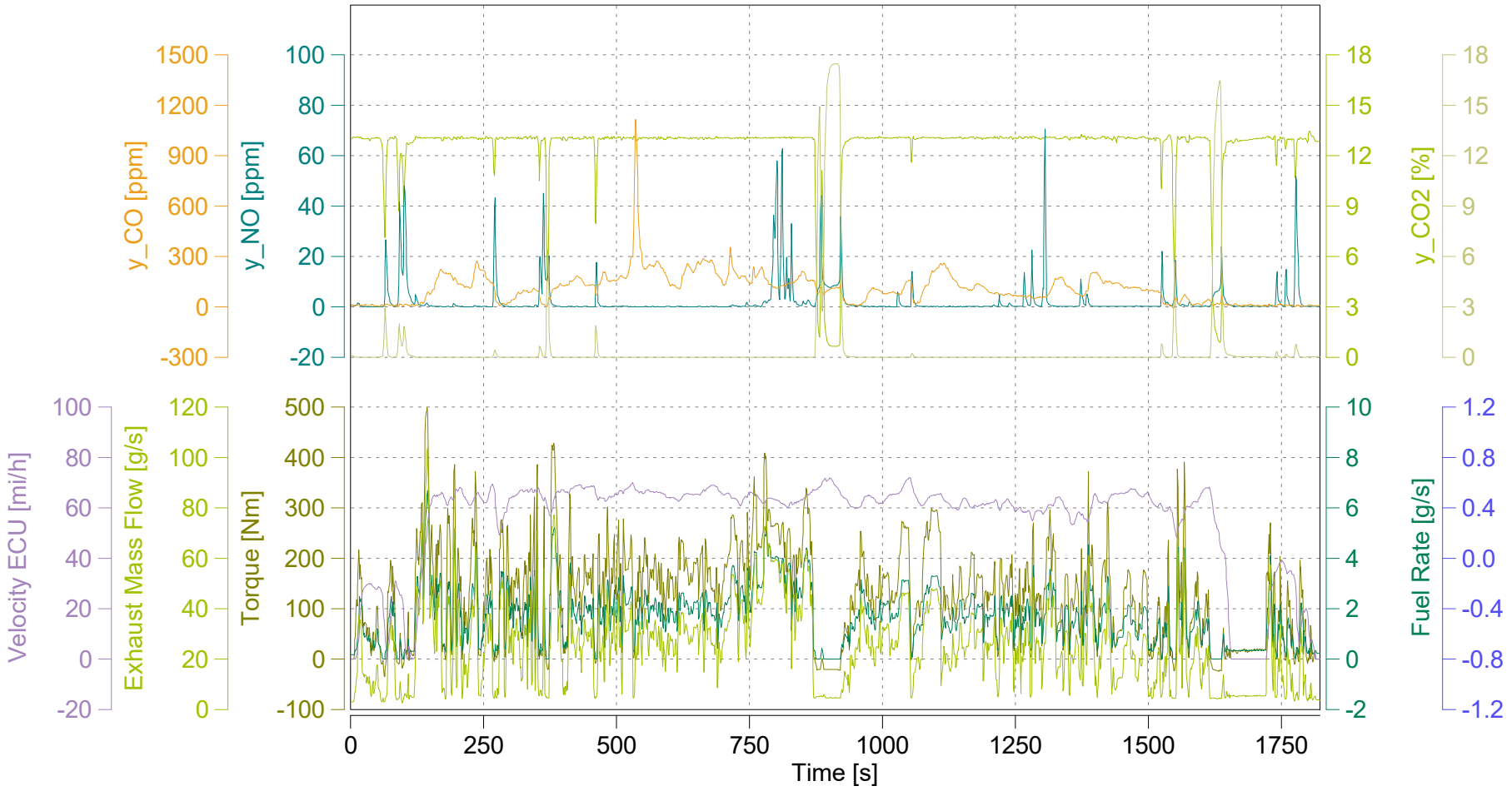
Apply Defa

Alignment Plo

Reset Time

Reset Al

Apply Curr



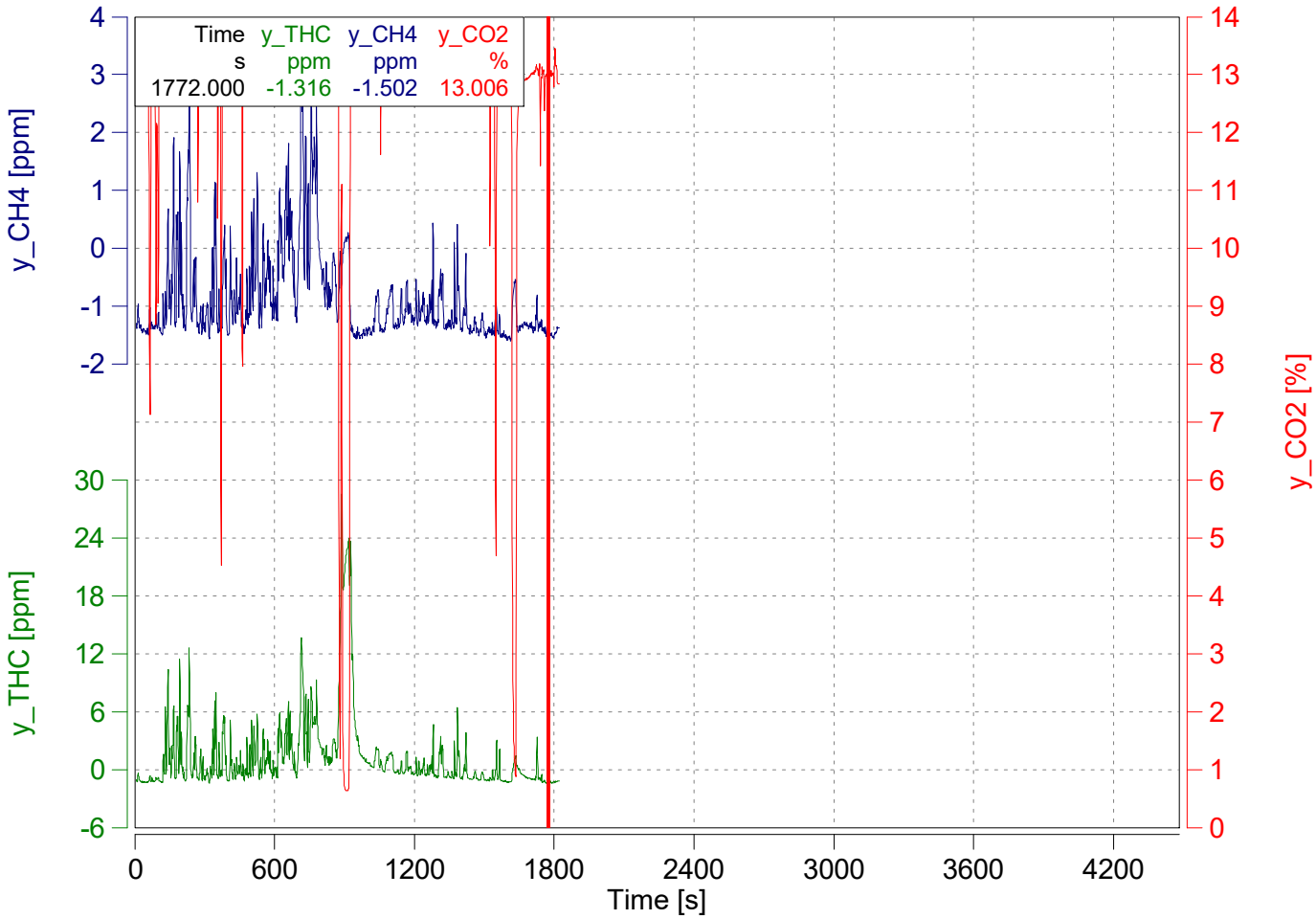
Concerto Version: 504 Build 119, Serial Number: 1604
M.O.V.E Post-Processing: DT_1R4.1_B340
Legislation:

Vehicle: L447-2128 /
Engine: /
NOx Ambient Condition Corr.: 7 - CFR40 §1065.670
Dry / Wet Corr.: 2 - CFR40 §86.1342-90

Case: L447-2128
Page: Time Alignment of Gas Concentrations

'A1 HWY EAST'
Start Date: 05/13/2021
Start Time: 09:07:53.0

AVL
Concerto M.O.V.E, 2019



Absolute Time Shifts

y_THC	s	-5.2
y_CH4	s	-7.2

Reset Time Shifts in Plot

Apply Current Values

Concerto Version: 504 Build 119, Serial Number: 1604
M.O.V.E Post-Processing: DT_1R4.1_B340
Legislation:

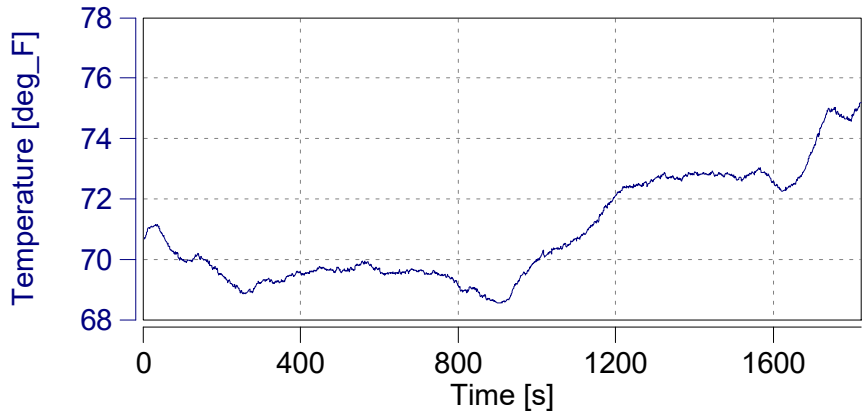
Vehicle: L447-2128 /
Engine: /
NOx Ambient Condition Corr.: 7 - CFR40 §1065.670
Dry / Wet Corr.: 2 - CFR40 §86.1342-90

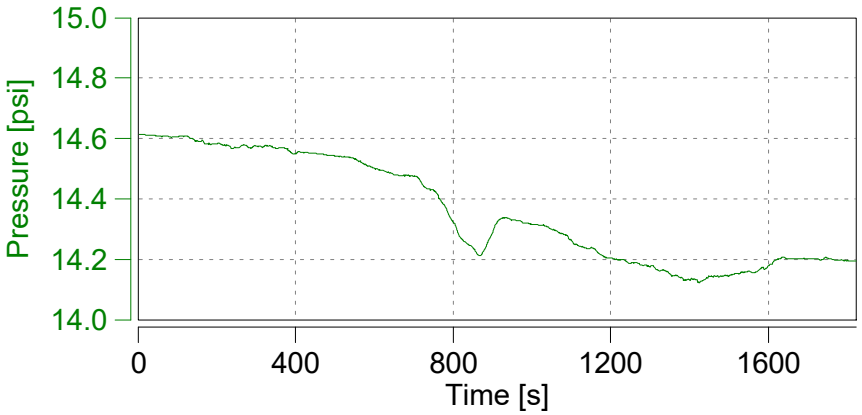
Case: L447-2128
Page: Ambient Conditions

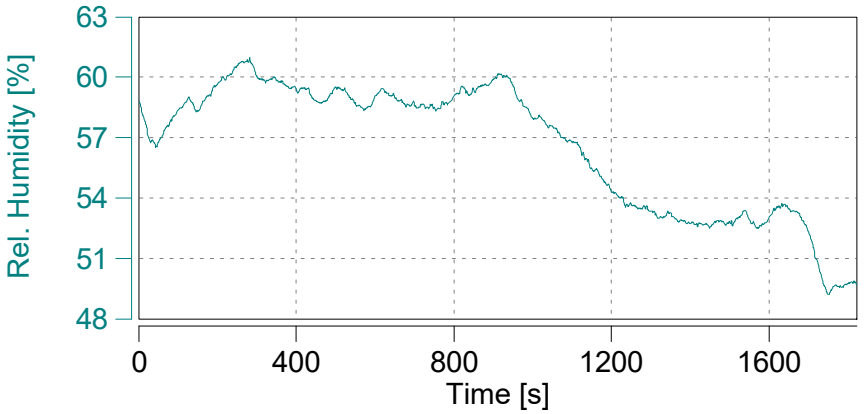
'A1 HWY EAST'
Start Date: 05/13/2021
Start Time: 09:07:53.0

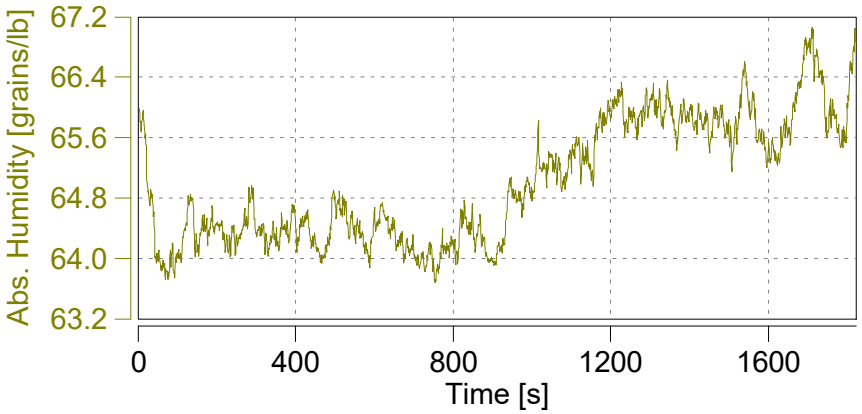
AVL

Concerto M.O.V.E, 2019









Concerto Version: 504 Build 119, Serial Number: 1604
M.O.V.E Post-Processing: DT_1R4.1_B340
Legislation:

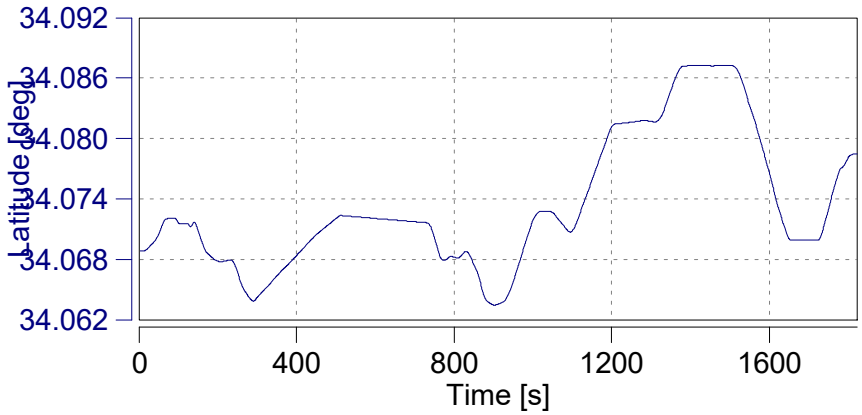
Vehicle: L447-2128 /
Engine: /
NOx Ambient Condition Corr.: 7 - CFR40 §1065.670
Dry / Wet Corr.: 2 - CFR40 §86.1342-90

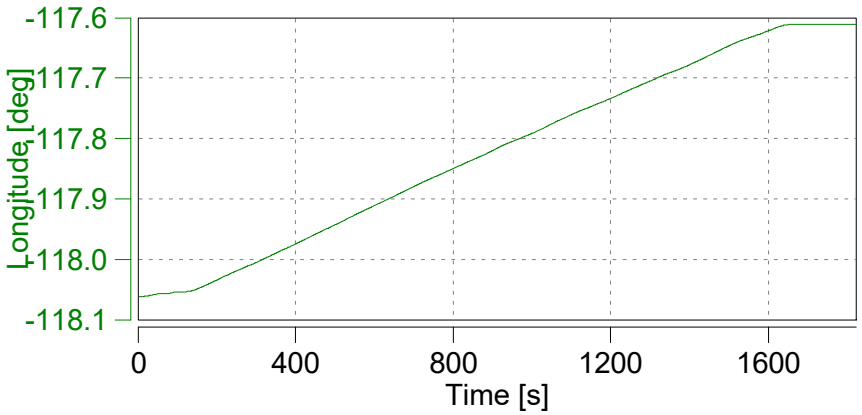
Case: L447-2128
Page: GPS

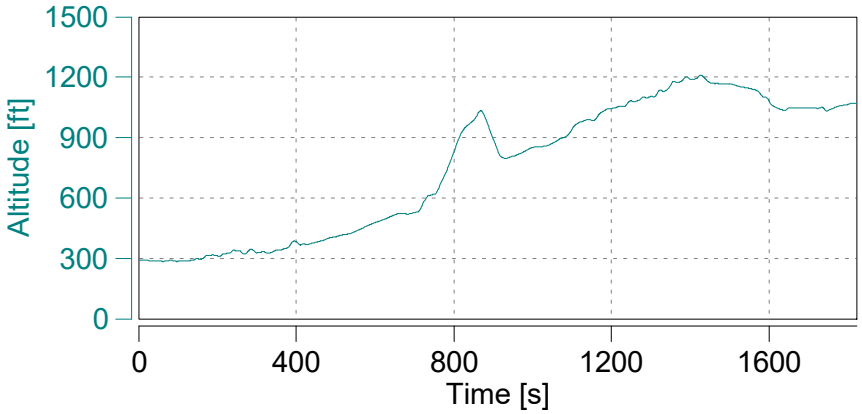
'A1 HWY EAST'
Start Date: 05/13/2021
Start Time: 09:07:53.0

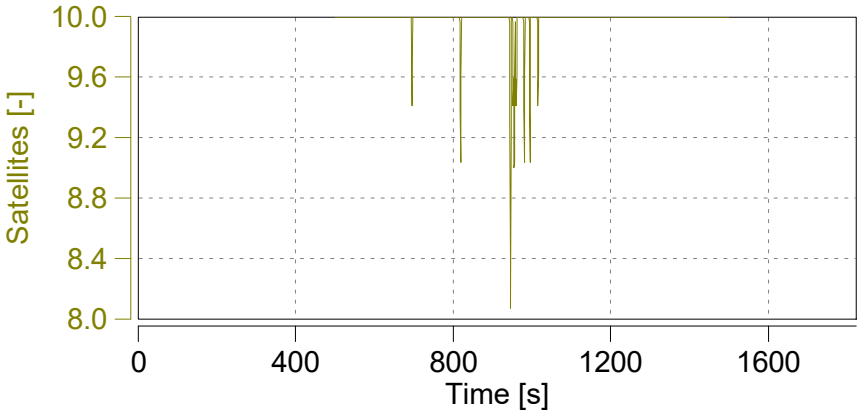
AVL

Concerto M.O.V.E, 2019









Concerto Version: 504 Build 119, Serial Number: 1604
M.O.V.E Post-Processing: DT_1R4.1_B340
Legislation:

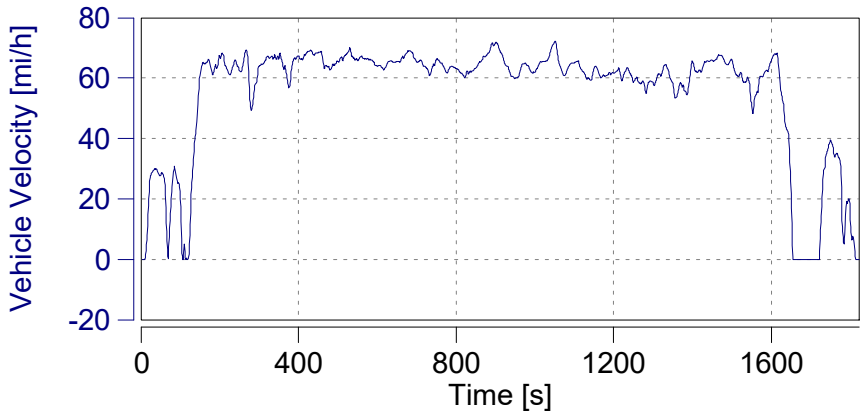
Vehicle: L447-2128 /
Engine: /
NOx Ambient Condition Corr.: 7 - CFR40 §1065.670
Dry / Wet Corr.: 2 - CFR40 §86.1342-90

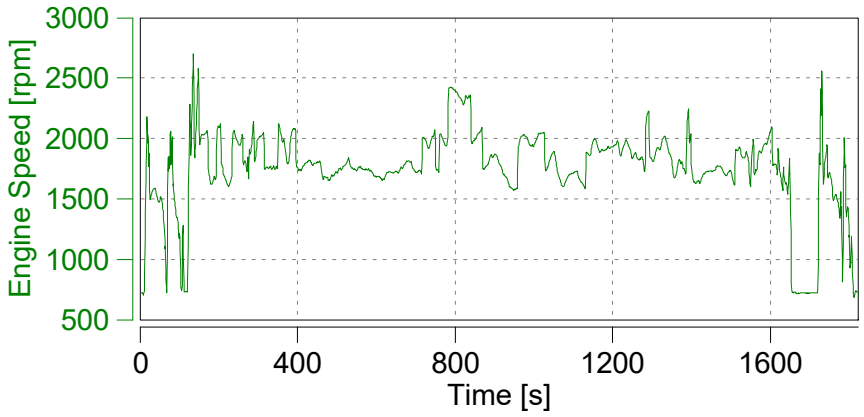
Case: L447-2128
Page: Engine (1)

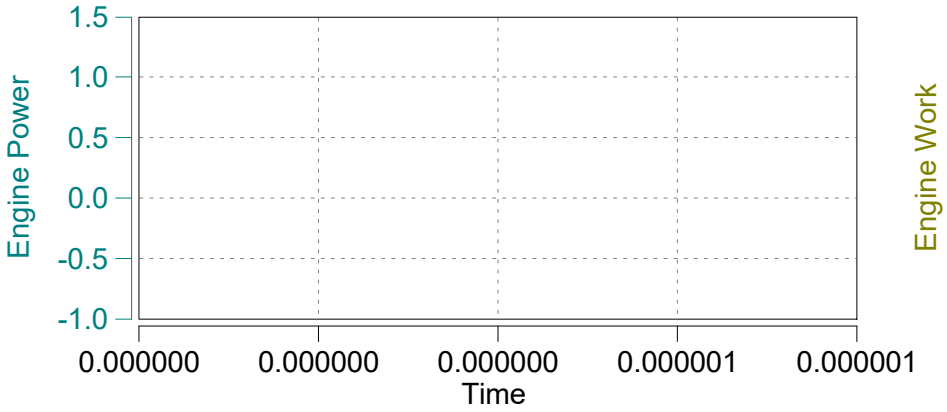
'A1 HWY EAST'
Start Date: 05/13/2021
Start Time: 09:07:53.0

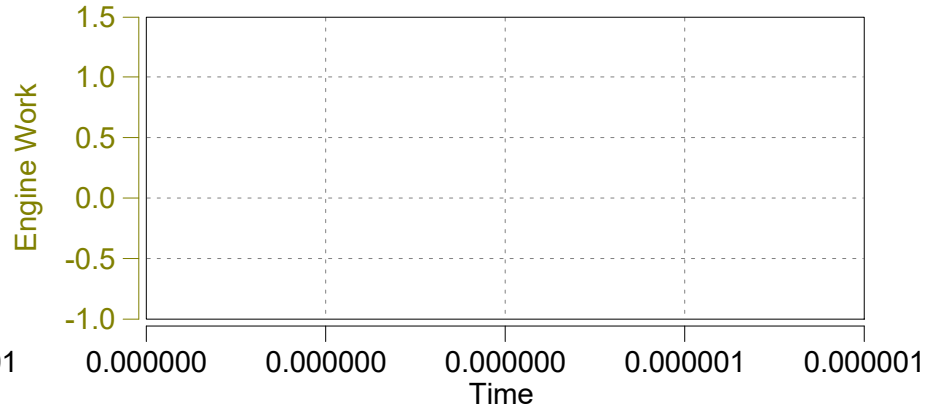
AVL

Concerto M.O.V.E, 2019









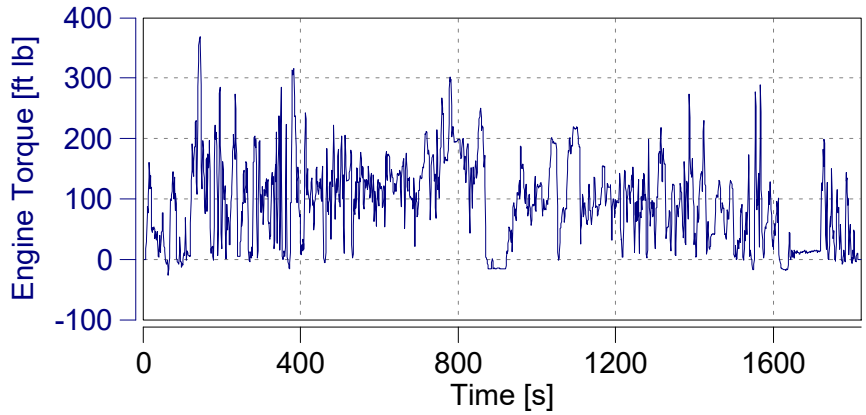
Concerto Version: 504 Build 119, Serial Number: 1604
M.O.V.E Post-Processing: DT_1R4.1_B340
Legislation:

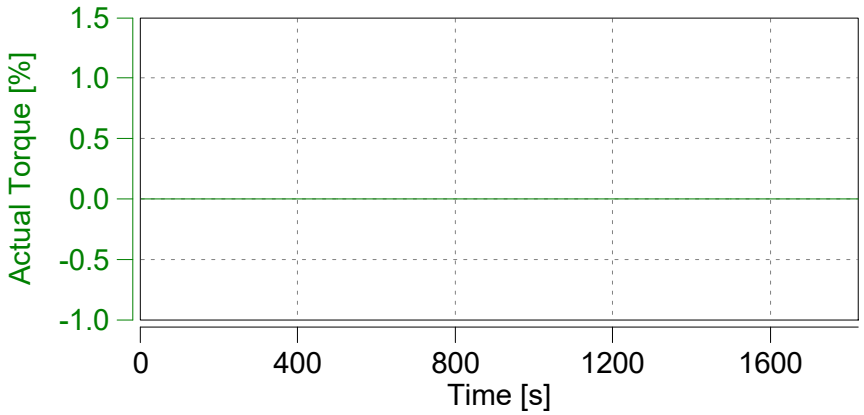
Vehicle: L447-2128 /
Engine: /
NOx Ambient Condition Corr.: 7 - CFR40 §1065.670
Dry / Wet Corr.: 2 - CFR40 §86.1342-90

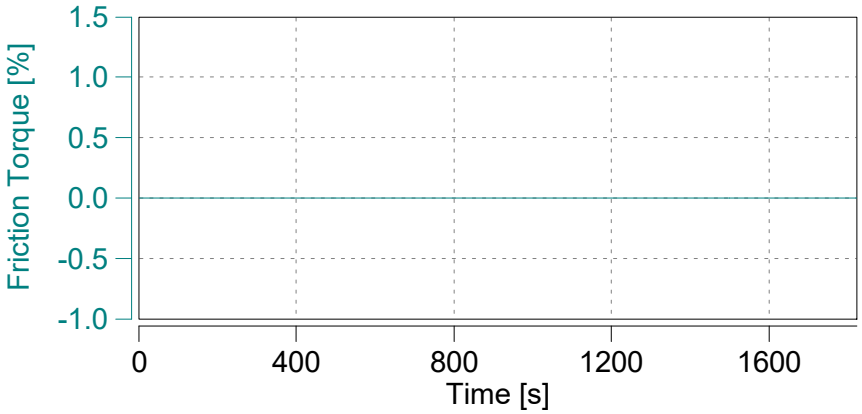
'A1 HWY EAST'
Start Date: 05/13/2021
Start Time: 09:07:53.0

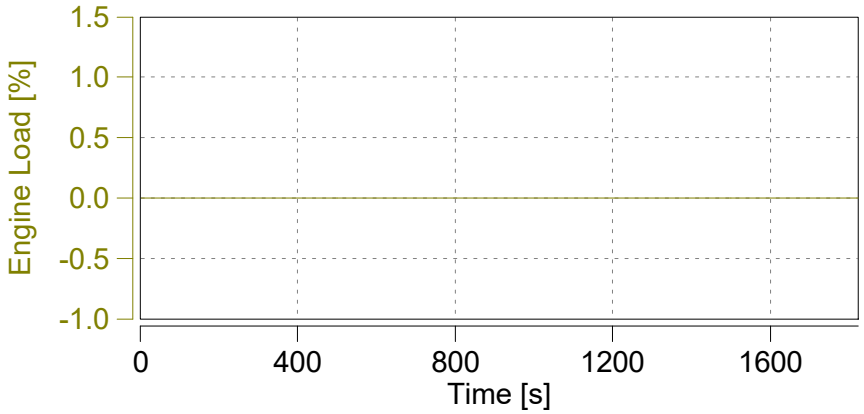
AVL

Concerto M.O.V.E, 2019





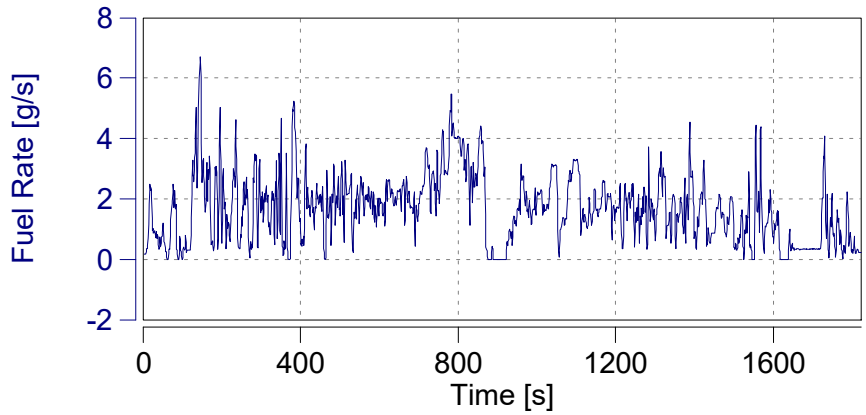


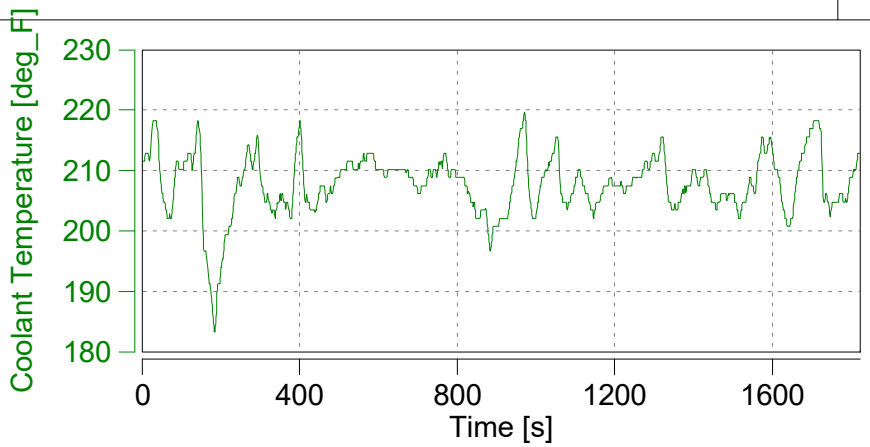


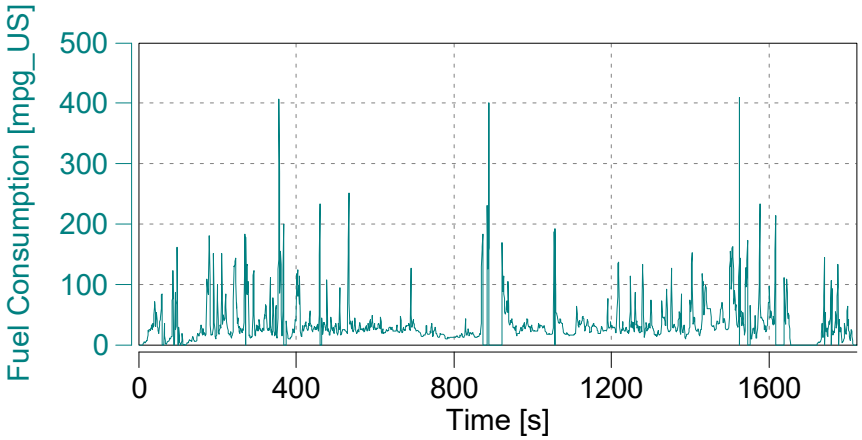
'A1 HWY EAST'
Start Date: 05/13/2021
Start Time: 09:07:53.0

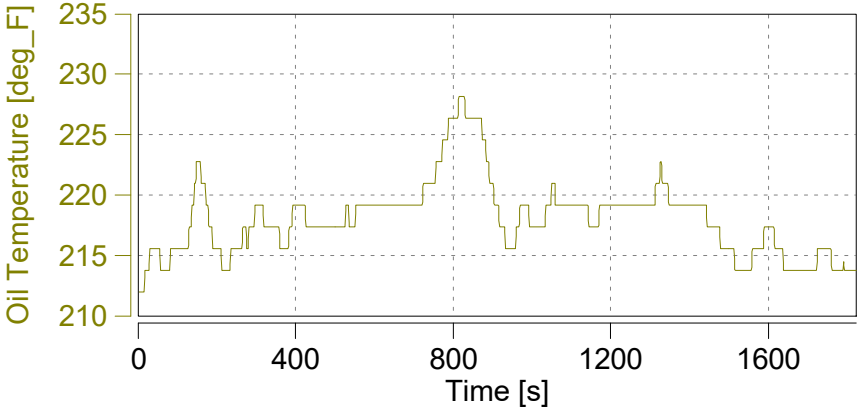
AVL

Concerto M.O.V.E, 2019









Concerto Version: 504 Build 119, Serial Number: 1604
M.O.V.E Post-Processing: DT_1R4.1_B340
Legislation:

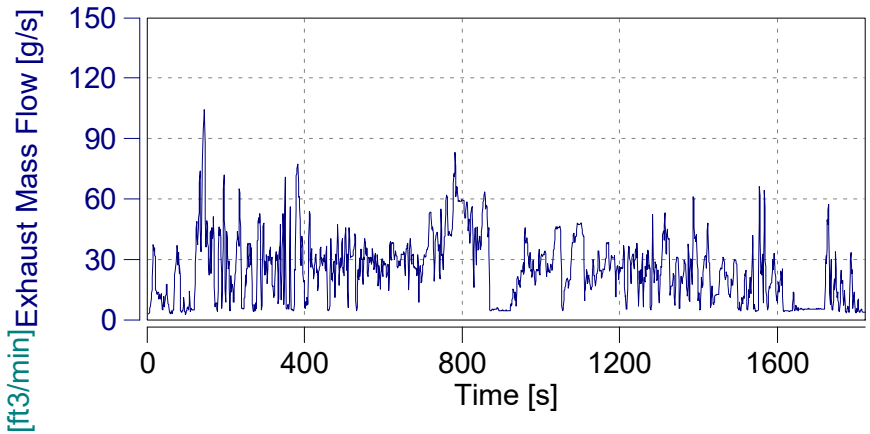
Vehicle: L447-2128 /
Engine: /
NOx Ambient Condition Corr.: 7 - CFR40 §1065.670
Dry / Wet Corr.: 2 - CFR40 §86.1342-90

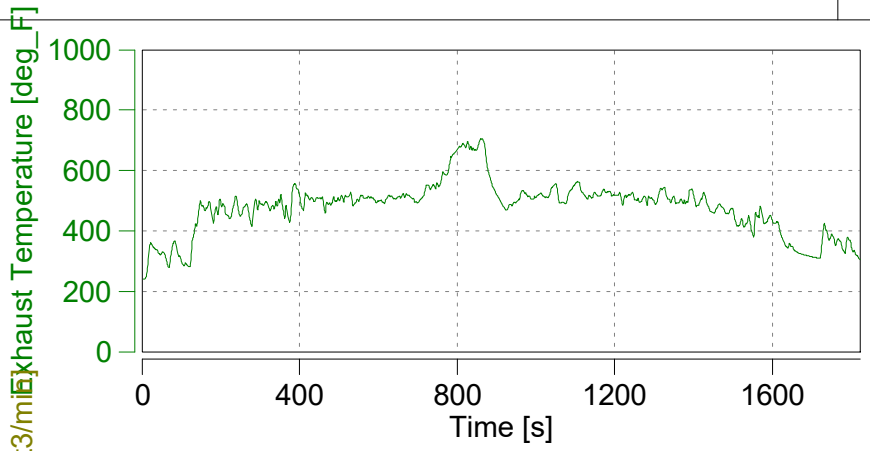
Case: L447-2128
Page: Exhaust Flow (1)

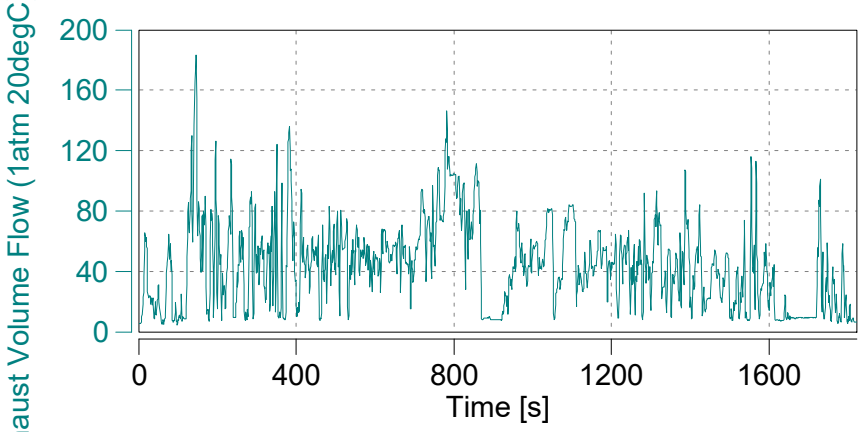
'A1 HWY EAST'
Start Date: 05/13/2021
Start Time: 09:07:53.0

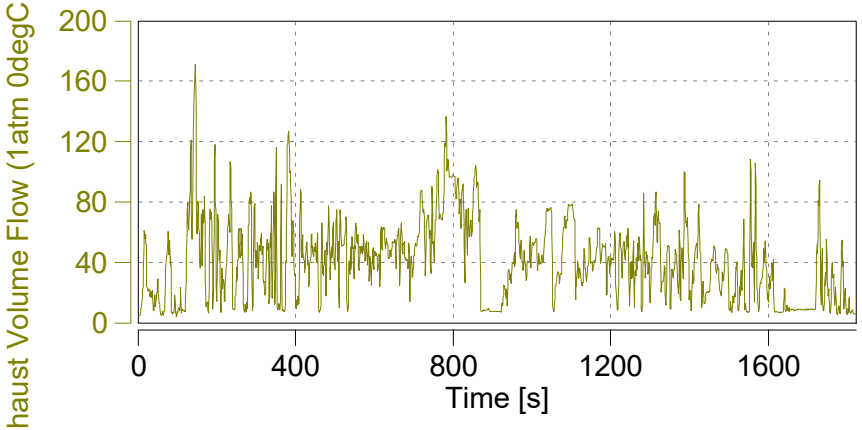
AVL

Concerto M.O.V.E, 2019









Concerto Version: 504 Build 119, Serial Number: 1604
M.O.V.E Post-Processing: DT_1R4.1_B340
Legislation:

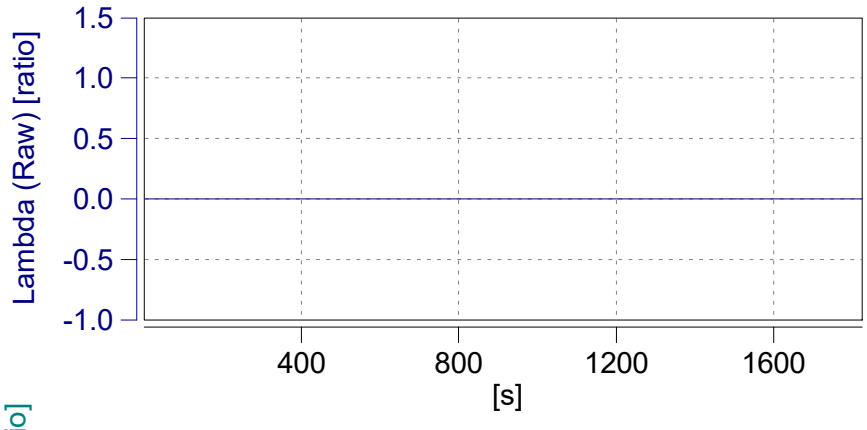
Vehicle: L447-2128 /
Engine: /
NOx Ambient Condition Corr.: 7 - CFR40 §1065.670
Dry / Wet Corr.: 2 - CFR40 §86.1342-90

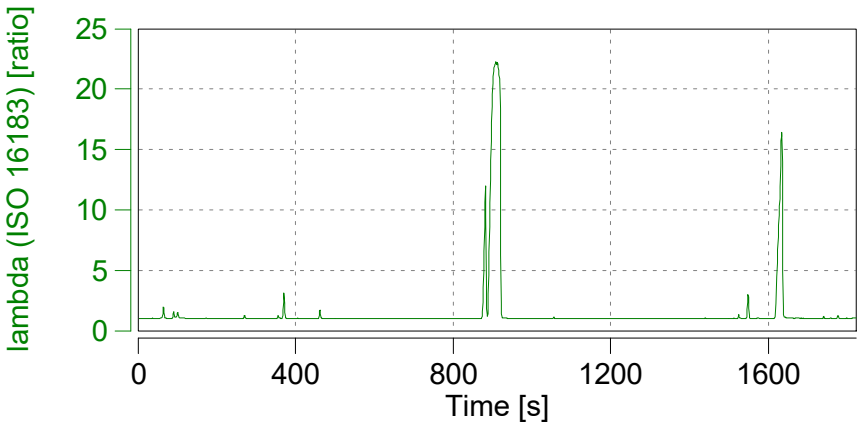
Case: L447-2128
Page: Exhaust Flow (2)

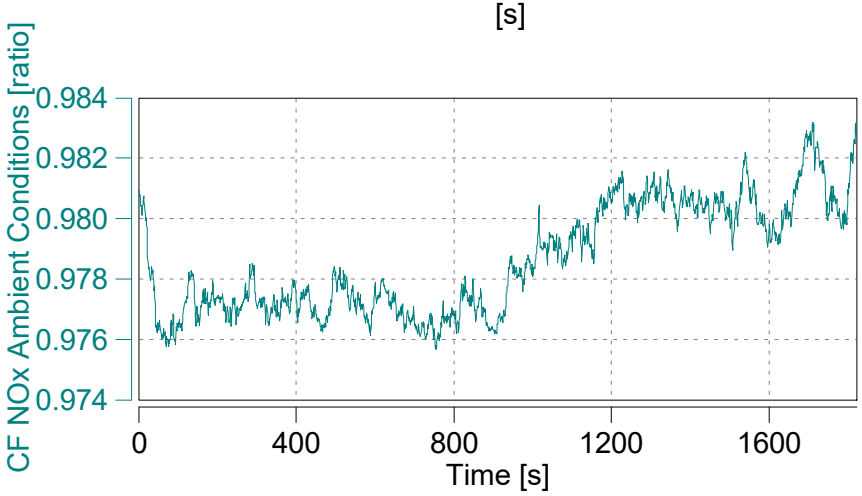
'A1 HWY EAST'
Start Date: 05/13/2021
Start Time: 09:07:53.0

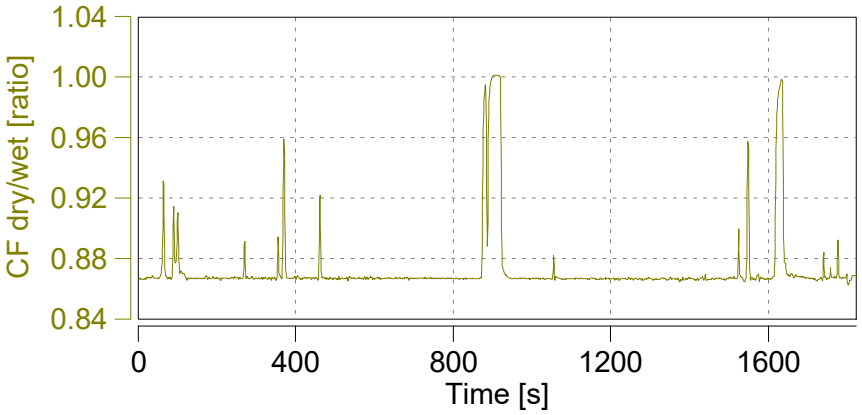
AVL

Concerto M.O.V.E, 2019









Concerto Version: 504 Build 119, Serial Number: 1604
M.O.V.E Post-Processing: DT_1R4.1_B340
Legislation:

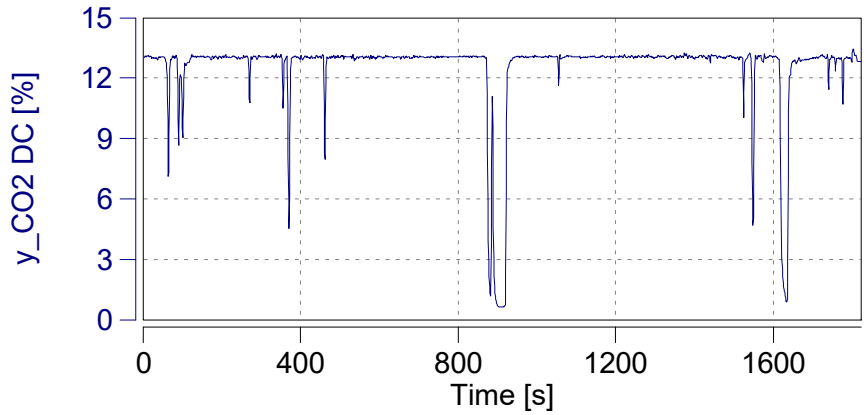
Vehicle: L447-2128 /
Engine: /
NOx Ambient Condition Corr.: 7 - CFR40 §1065.670
Dry / Wet Corr.: 2 - CFR40 §86.1342-90

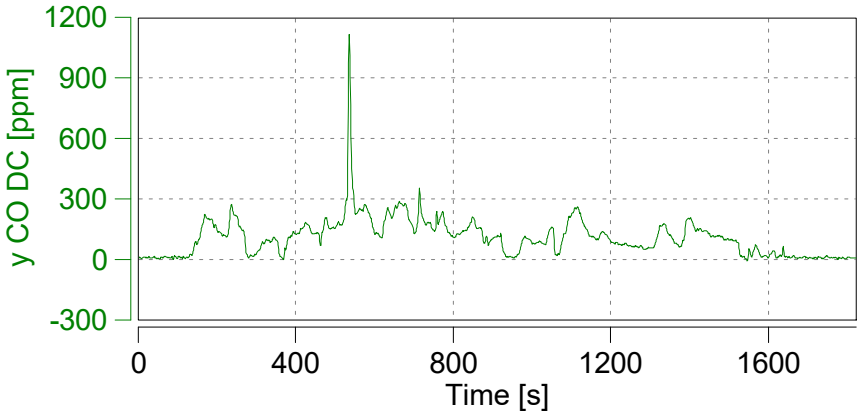
Case: L447-2128
Page: Corrected Emissions (1)

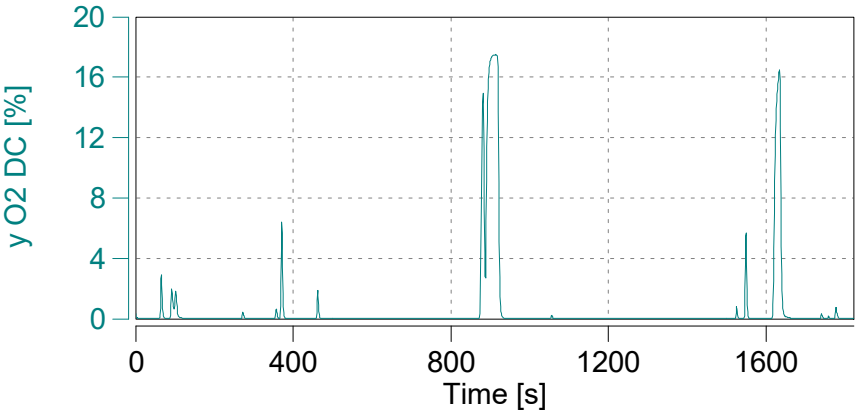
'A1 HWY EAST'
Start Date: 05/13/2021
Start Time: 09:07:53.0

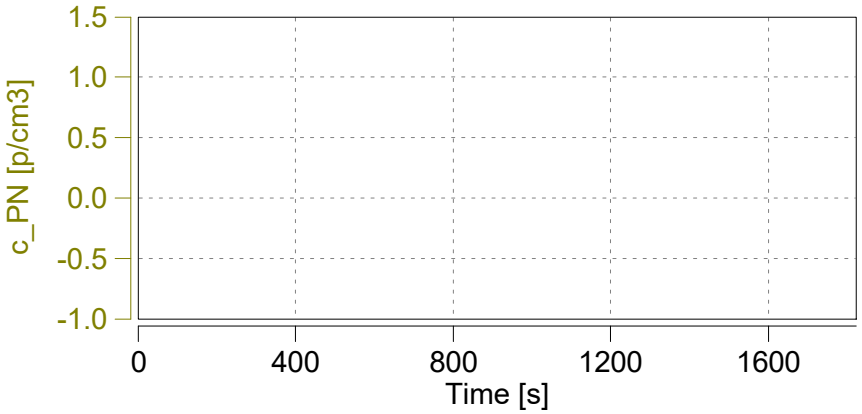
AVL

Concerto M.O.V.E, 2019









Concerto Version: 504 Build 119, Serial Number: 1604
M.O.V.E Post-Processing: DT_1R4.1_B340
Legislation:

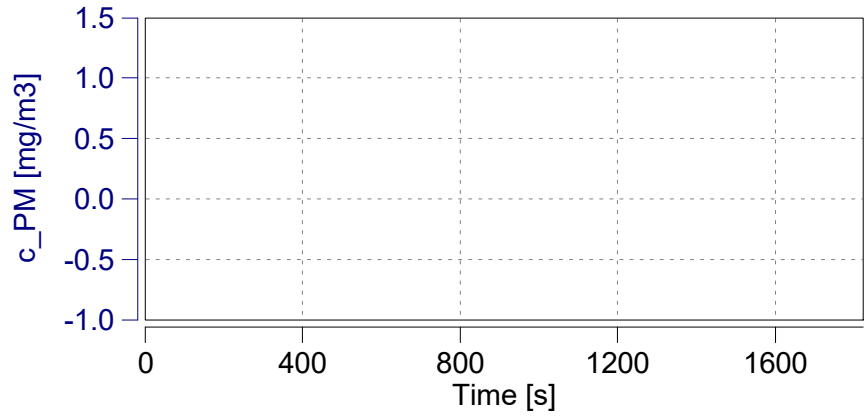
Vehicle: L447-2128 /
Engine: /
NOx Ambient Condition Corr.: 7 - CFR40 §1065.670
Dry / Wet Corr.: 2 - CFR40 §86.1342-90

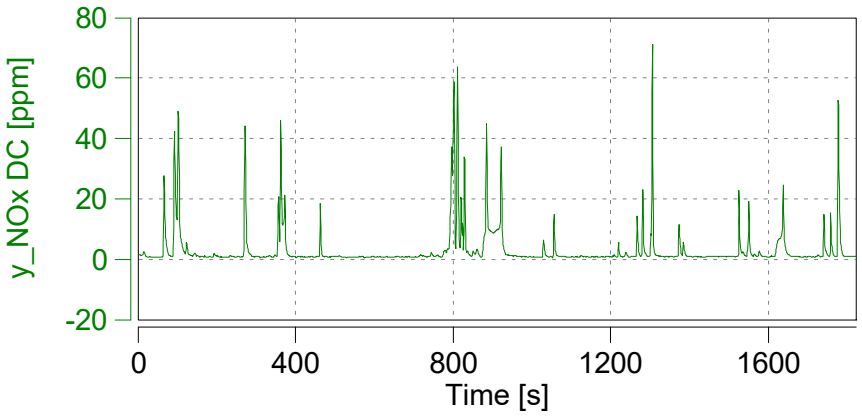
Case: L447-2128
Page: Corrected Emissions (2)

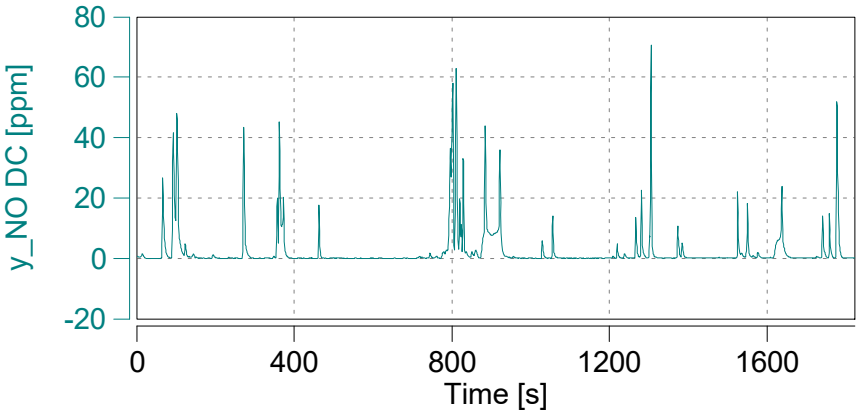
'A1 HWY EAST'
Start Date: 05/13/2021
Start Time: 09:07:53.0

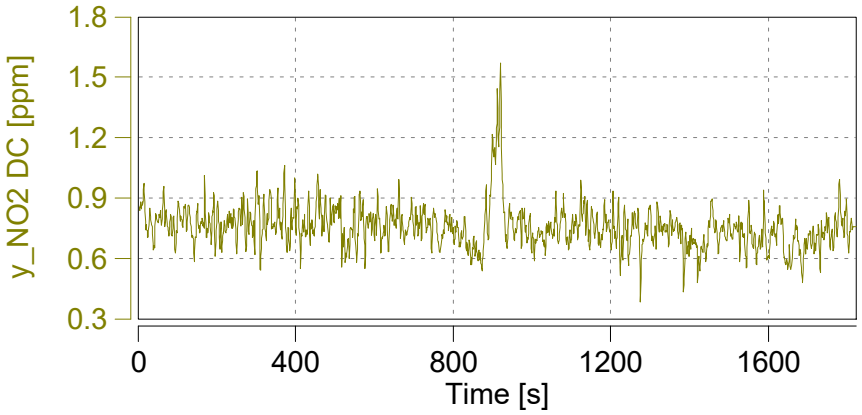
AVL

Concerto M.O.V.E, 2019









Concerto Version: 504 Build 119, Serial Number: 1604
M.O.V.E Post-Processing: DT_1R4.1_B340
Legislation:

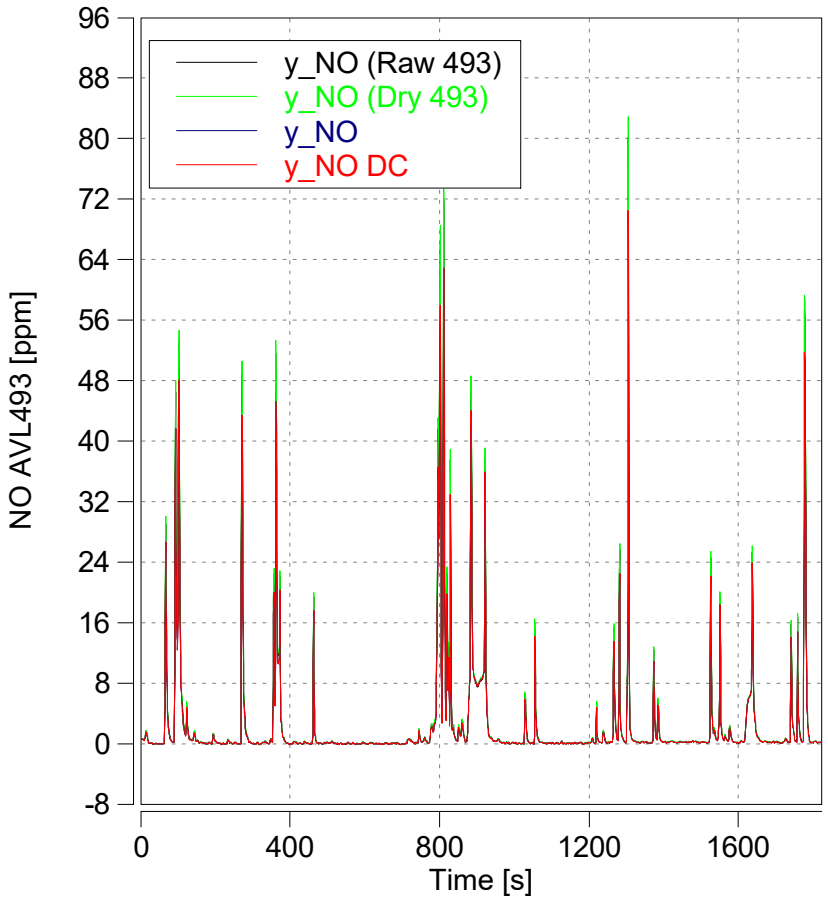
Vehicle: L447-2128 /
Engine: /
NOx Ambient Condition Corr.: 7 - CFR40 §1065.670
Dry / Wet Corr.: 2 - CFR40 §86.1342-90

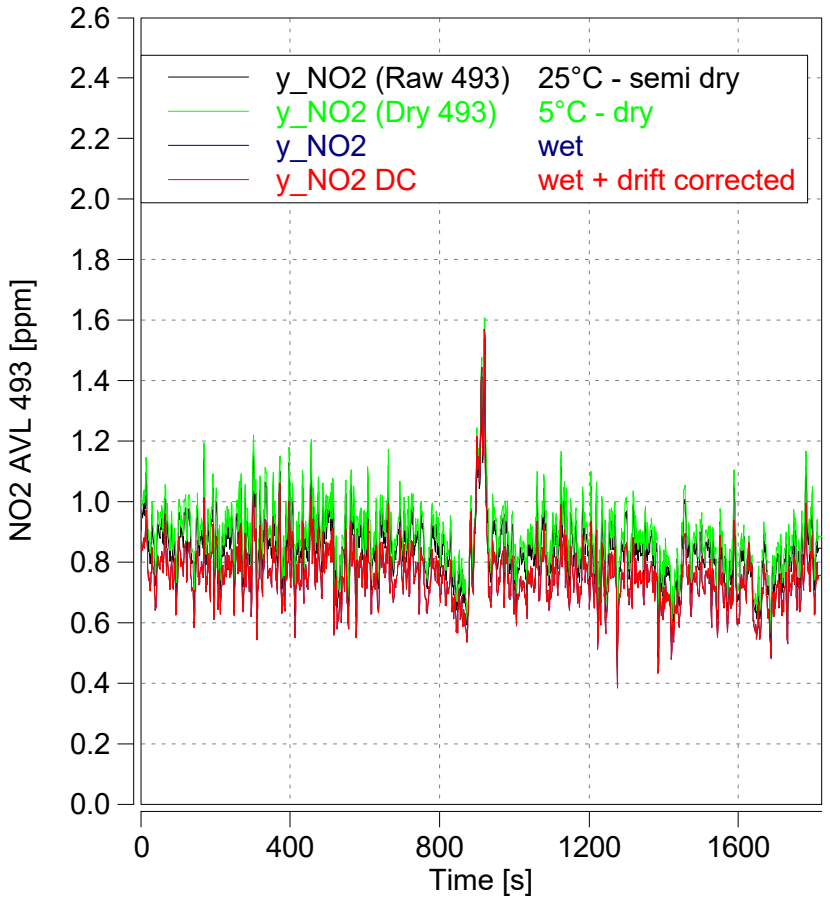
Case: L447-2128
Page: Corrected Emissions (3)

'A1 HWY EAST'
Start Date: 05/13/2021
Start Time: 09:07:53.0

AVL

Concerto M.O.V.E, 2019

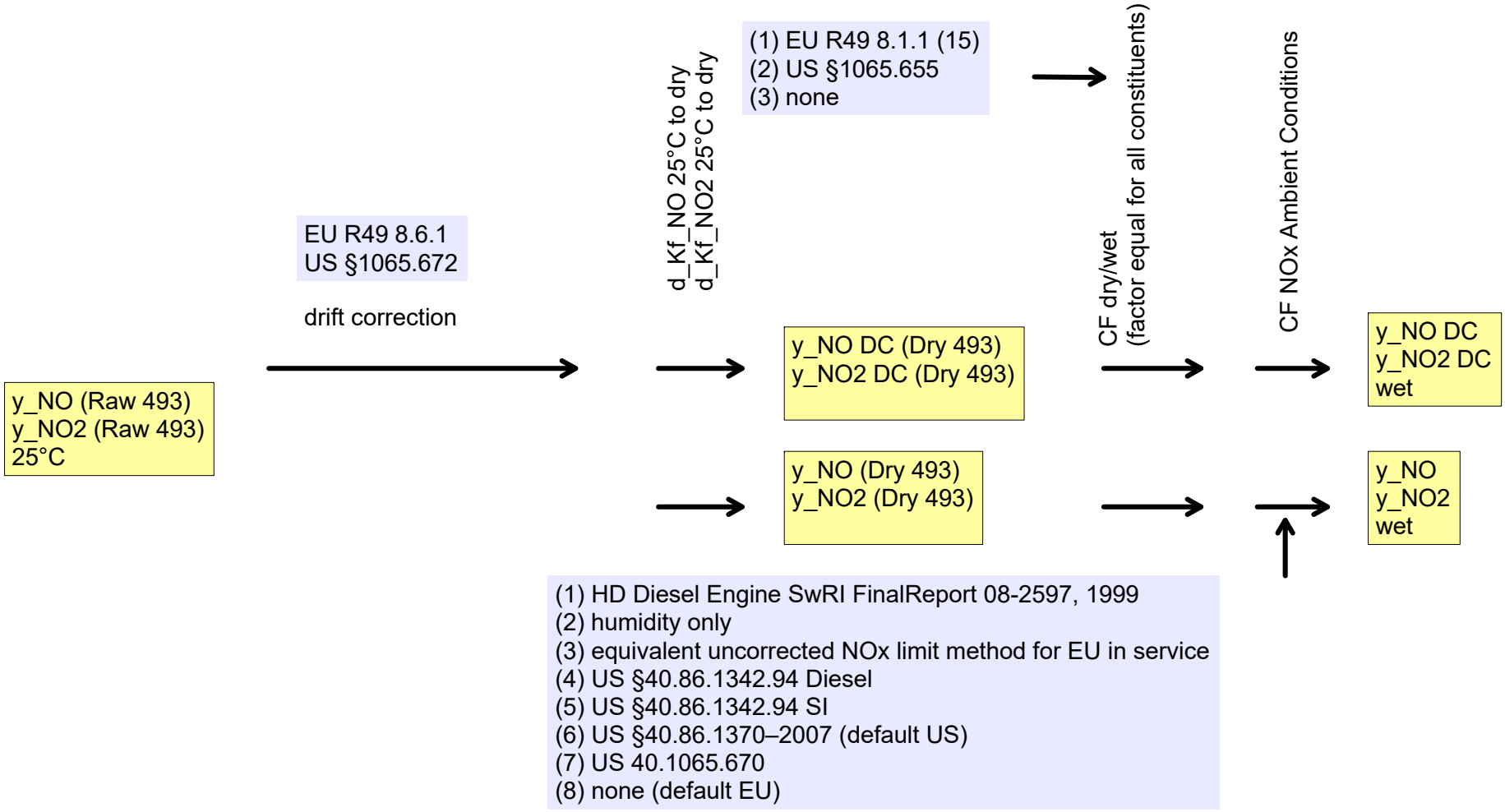




Concerto Version: 504 Build 119, Serial Number: 1604
M.O.V.E Post-Processing: DT_1R4.1_B340
Legislation:

Vehicle: L447-2128 /
Engine: /
NOx Ambient Condition Corr.: 7 - CFR40 §1065.670
Dry / Wet Corr.: 2 - CFR40 §86.1342-90

NOx - AVL 493

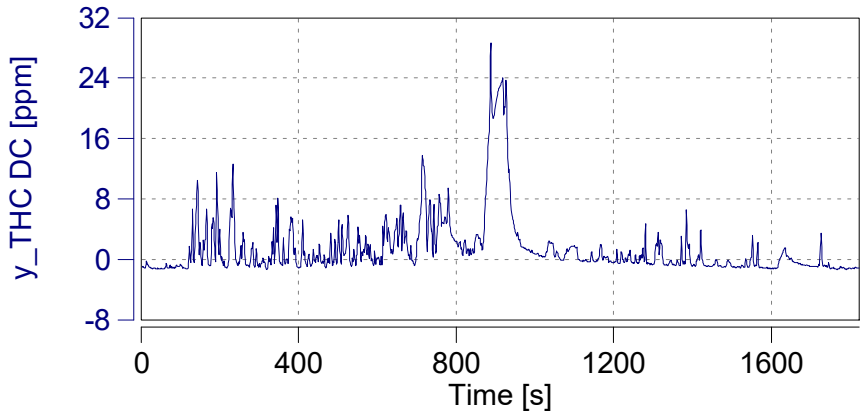

y_NO (Raw 493)
y_NO2 (Raw 493)
25°C
EU R49 8.6.1
US §1065.672
drift correction
d_Kf_NO 25°C to dry
d_Kf_NO2 25°C to dry
(1) EU R49 8.1.1 (15)
(2) US §1065.655
(3) none
y_NO DC (Dry 493)
y_NO2 DC (Dry 493)
y_NO (Dry 493)
y_NO2 (Dry 493)
CF dry/wet
(factor equal for all constituents)
CF NOx Ambient Conditions
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)

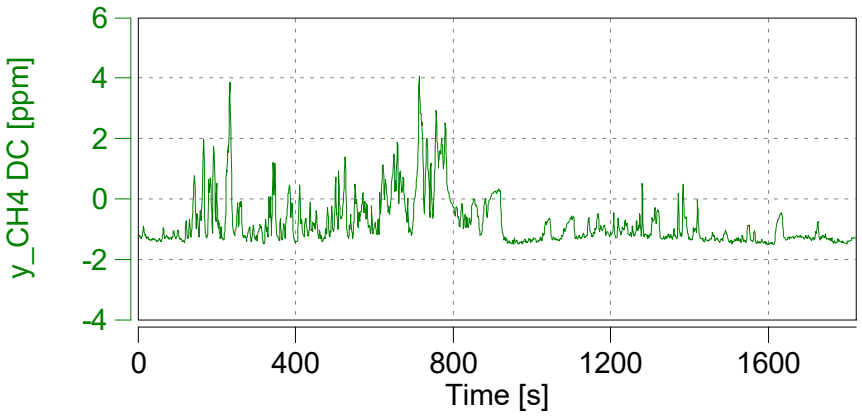
Case: L447-2128
Page: Corrected Emissions (5)

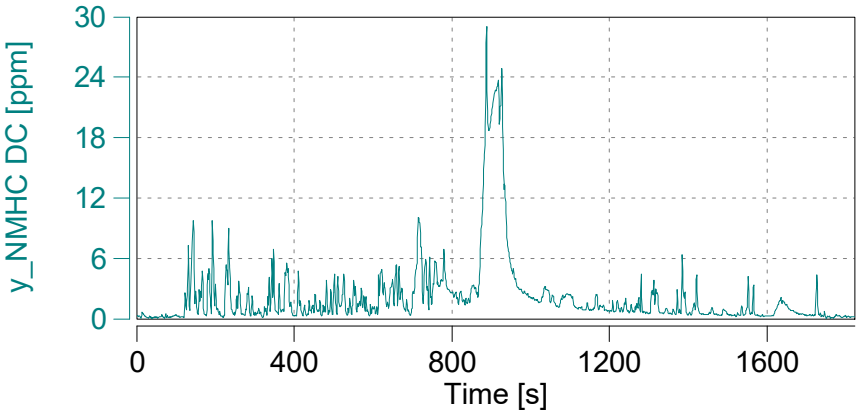
'A1 HWY EAST'
Start Date: 05/13/2021
Start Time: 09:07:53.0

AVL

Concerto M.O.V.E, 2019







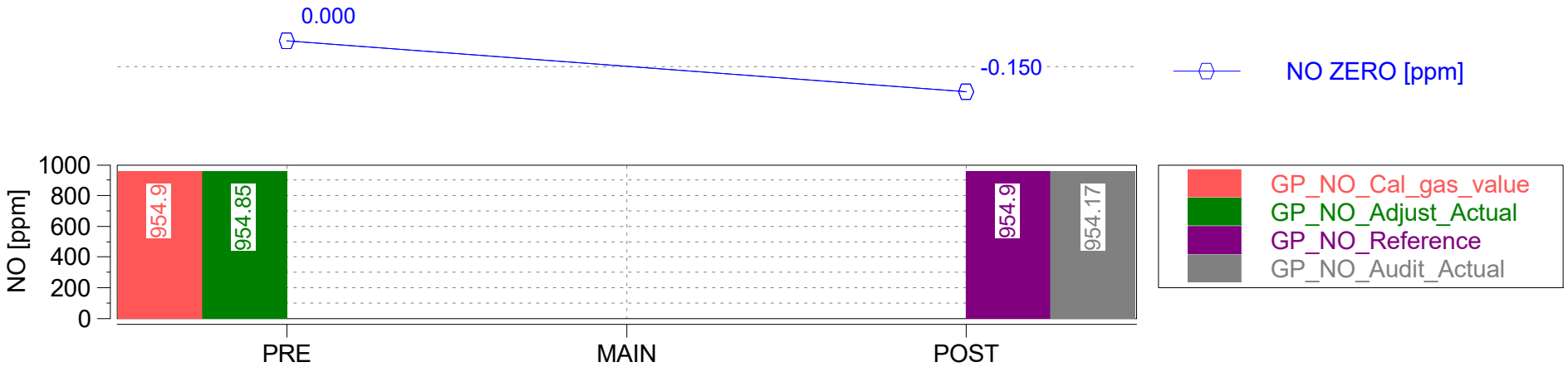
Concerto Version: 504 Build 119, Serial Number: 1604
M.O.V.E Post-Processing: DT_1R4.1_B340
Legislation:

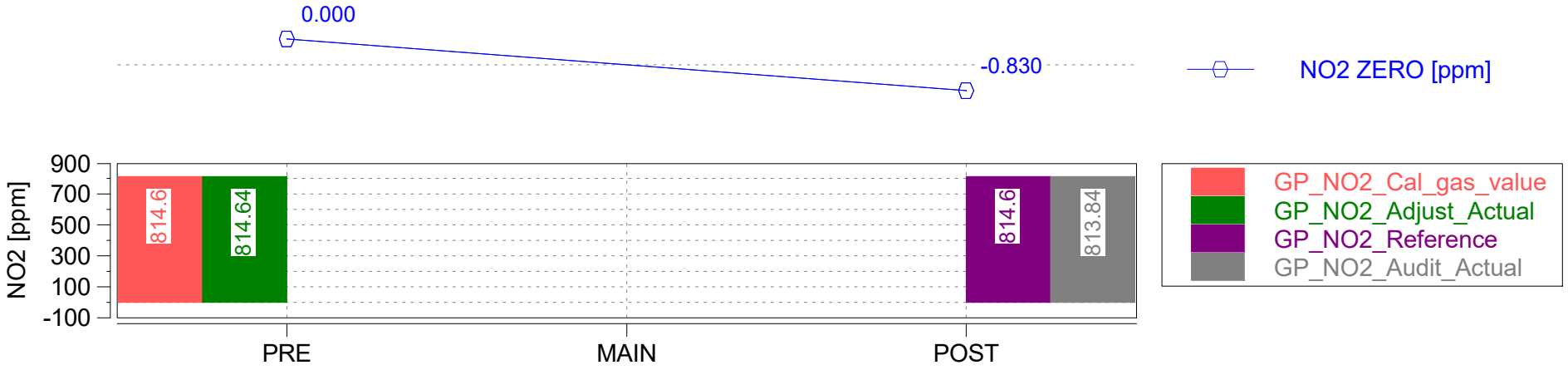
Vehicle: L447-2128 /
Engine: /
NOx Ambient Condition Corr.: 7 - CFR40 §1065.670
Dry / Wet Corr.: 2 - CFR40 §86.1342-90

Case: L447-2128
Page: NO/NO2/NOx Zero - Span

'A1 HWY EAST'
Start Date: 05/13/2021
Start Time: 09:07:53.0

AVL
Concerto M.O.V.E, 2019





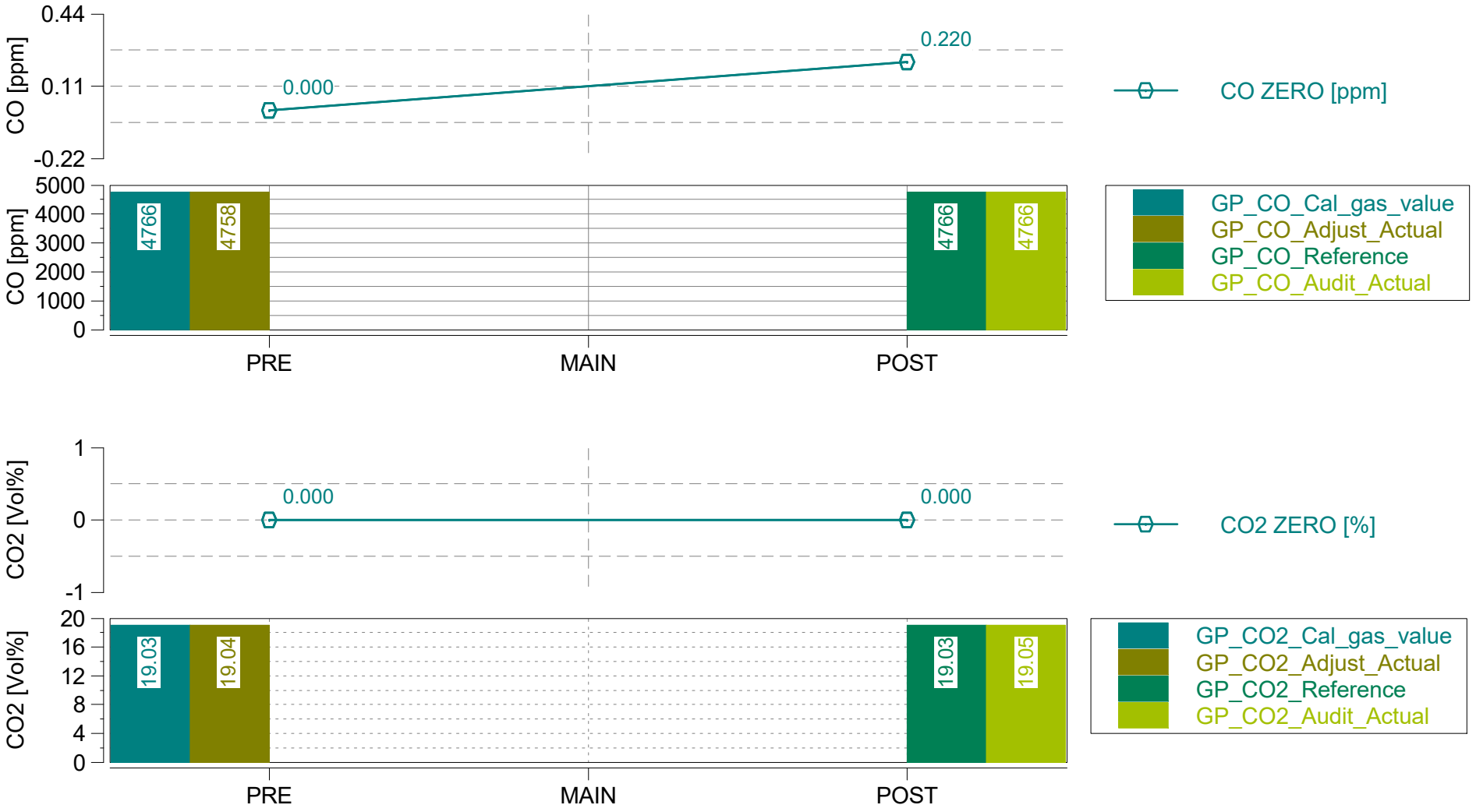
Concerto Version: 504 Build 119, Serial Number: 1604
M.O.V.E Post-Processing: DT_1R4.1_B340
Legislation:

Vehicle: L447-2128 /
Engine: /
NOx Ambient Condition Corr.: 7 - CFR40 §1065.670
Dry / Wet Corr.: 2 - CFR40 §86.1342-90

Case: L447-2128
Page: CO/CO2 Zero - Span

'A1 HWY EAST'
Start Date: 05/13/2021
Start Time: 09:07:53.0

AVL
Concerto M.O.V.E, 2019



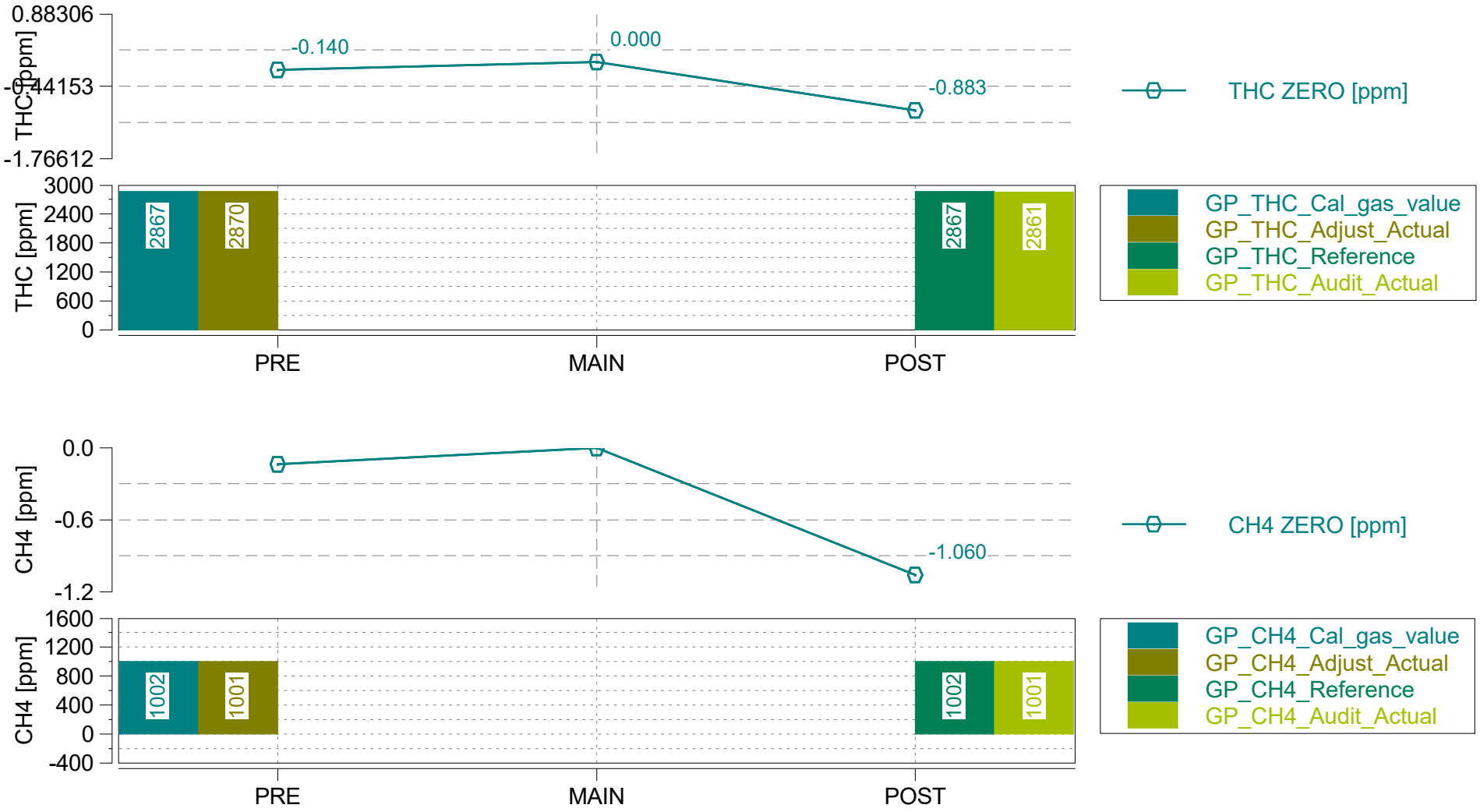
Concerto Version: 504 Build 119, Serial Number: 1604
M.O.V.E Post-Processing: DT_1R4.1_B340
Legislation:

Vehicle: L447-2128 /
Engine: /
NOx Ambient Condition Corr.: 7 - CFR40 §1065.670
Dry / Wet Corr.: 2 - CFR40 §86.1342-90

Case: L447-2128
Page: THC/CH4 Zero - Span

'A1 HWY EAST'
Start Date: 05/13/2021
Start Time: 09:07:53.0

AVL
Concerto M.O.V.E, 2019



Concerto Version: 504 Build 119, Serial Number: 1604
M.O.V.E Post-Processing: DT_1R4.1_B340
Legislation:

Vehicle: L447-2128 /
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%	**0.07**	**%**	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	0597
Firmware Version	V1.16
Main Test Date	2021-05-13
Leak Check Age [days]	0

Device ID	AVL4925
Serial Number	175
Firmware Version	1.20.0.8

EFM

Device ID	AVL495
Serial Number	00915
Serial Number Tube	01115
Firmware Version	V1.13

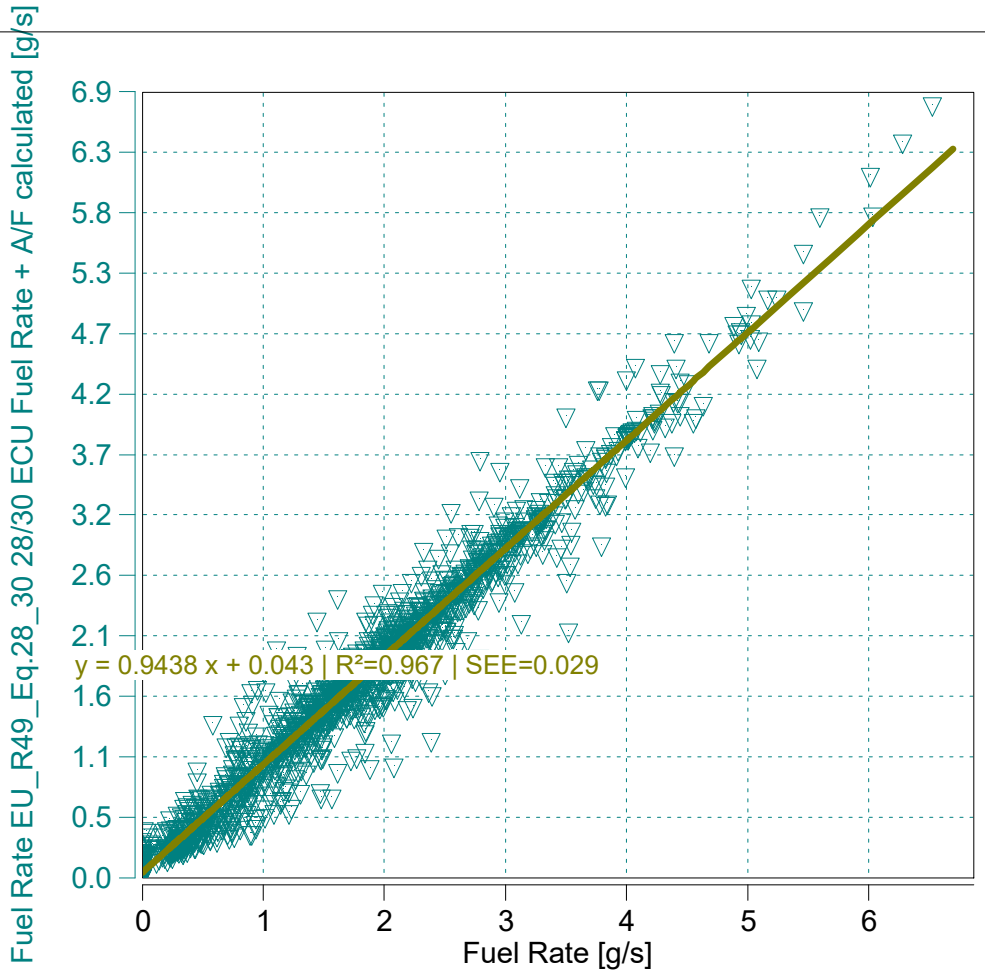
System Control

SC Version	V2.6_212
SC Serial Number	60300923

Case: L447-2128
Page: Fuel Rate ECU vs. Calculated

'A1 HWY EAST'
Start Date: 05/13/2021
Start Time: 09:07:53.0

AVL
Concerto M.O.V.E, 2019



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

y = 0.9438 x + 0.043 | R²=0.967 | SEE=0.029
m = 0.94 (0.9 - 1.1 recommended)
R² = 0.97 (min 0.9 mandatory)

Data from - to [% of Maximum]

0 100

Concerto Version: 504 Build 119, Serial Number: 1604
M.O.V.E Post-Processing: DT_1R4.1_B340
Legislation:

Vehicle: L447-2128 /
Engine: /
NOx Ambient Condition Corr.: 7 - CFR40 §1065.670
Dry / Wet Corr.: 2 - CFR40 §86.1342-90

Case: L447-2128
Page: Trip Summary

'B2 HWY WEST'
Start Date: 05/13/2021
Start Time: 09:07:53.0

AVL
Concerto M.O.V.E, 2019

Trip Duration	2332.00	s
Trip Duration (a)	2332.00	s
Trip Distance	28.49	mi
Trip Distance (a)	28.49	mi
Trip Fuel Cons. (b)	2.99	kg
Trip Fuel Cons. (ab)	2.99	kg
Trip Fuel Cons. EU (ac)	2.89	kg
Trip Fuel Cons. US (ac)	2.86	kg
Trip Fuel Economy (b)	26.98	mpg_US
Trip Fuel Economy (ab)	26.98	mpg_US
Trip Fuel Economy EU (ac)	27.92	mpg_US
Trip Fuel Economy US (ac)	28.18	mpg_US
Trip Fuel Economy GGE (b)	26.98	mpg_US
Trip Fuel Economy GGE (ab)	26.98	mpg_US
Trip Fuel Economy EU GGE (ac)	27.92	mpg_US
Trip Fuel Economy US GGE (ac)	28.18	mpg_US
Trip Av. Eng. Speed	1719.76	rpm
Trip Av. Torque	66.24	lbft
Trip Av. Power	23.95	hp
Trip Work		
Trip Work (a)	15.51	hphr
Trip Exhaust Mass	44.62	kg
Trip Exhaust Mass EU (ac)	45.82	kg
Trip Exhaust Mass US (ac)	46.25	kg
Trip Av. Amb. Temperature	77.94	deg_F
Trip Av. Humidity	46.37	%
Trip Av. GPS Altitude	221.19	m
Fuel Type	Petrol (E10)	

ave THC	-0.08115	ppm
ave NMHC	1.39605	ppm
ave CH4	-1.47720	ppm
ave CO	46.21994	ppm
ave CO2	12.42908	%
ave NOx	7.53484	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	0.02215	g
tot NMHC	0.03716	g
tot CH4	0.00166	g
tot CO	3.00019	g
tot CO2	8708.06683	g
tot NO (d)	0.76528	g
tot NO2	0.00499	g
tot NOx	0.76798	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	43.97692	mi/hr
Trip Distance Share Urban	13.32761	% distance
Trip Distance Share Rural	22.66787	% distance
Trip Distance Share Motorway	64.00452	% distance

BS CO2	561.34717	g/hphr
BS CO	0.19340	g/hphr
BS THC	0.00143	g/hphr
BS NMHC	0.00240	g/hphr
BS CH4	0.00011	g/hphr
BS NO (d)	0.04933	g/hphr
BS NO2	0.00032	g/hphr
BS NOx	0.04951	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	305.68273	g/mi
DS CO	0.10532	g/mi
DS THC	0.00078	g/mi
DS NMHC	0.00130	g/mi
DS CH4	0.00006	g/mi
DS NO (d)	0.02686	g/mi
DS NO2	0.00018	g/mi
DS NOx	0.02696	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	2914.91821	g/kg
FS CO	1.00428	g/kg
FS THC	0.00741	g/kg
FS NMHC	0.01244	g/kg
FS CH4	0.00056	g/kg
FS NO (d)	0.25617	g/kg
FS NO2	0.00167	g/kg
FS NOx	0.25707	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: 504 Build 119, Serial Number: 1604
M.O.V.E Post-Processing: DT_1R4.1_B340
Legislation:

Vehicle: L447-2128 /
Engine: /
NOx Ambient Condition Corr.: 7 - CFR40 §1065.670
Dry / Wet Corr.: 2 - CFR40 §86.1342-90

Case: L447-2128
Page: Trip Summary Drift Corrected

'B2 HWY WEST'
Start Date: 05/13/2021
Start Time: 09:07:53.0

AVL
Concerto M.O.V.E, 2019

Trip Duration	2332.00	s
Trip Duration (a)	2332.00	s
Trip Distance	28.49	mi
Trip Distance (a)	28.49	mi
Trip Fuel Cons. (b)	2.99	kg
Trip Fuel Cons. (ab)	2.99	kg
Trip Fuel Cons. EU (ac)	2.89	kg
Trip Fuel Cons. US (ac)	2.86	kg
Trip Fuel Economy (b)	26.98	mpg_US
Trip Fuel Economy (ab)	26.98	mpg_US
Trip Fuel Economy EU (ac)	27.92	mpg_US
Trip Fuel Economy US (ac)	28.18	mpg_US
Trip Fuel Economy GGE (b)	26.98	mpg_US
Trip Fuel Economy GGE (ab)	26.98	mpg_US
Trip Fuel Economy EU GGE (ac)	27.92	mpg_US
Trip Fuel Economy US GGE (ac)	28.18	mpg_US
Trip Av. Eng. Speed	1719.76	rpm
Trip Av. Torque	66.24	lbft
Trip Av. Power	23.95	hp
Trip Work		
Trip Work (a)	15.51	hphr
Trip Exhaust Mass	44.62	kg
Trip Exhaust Mass EU (ac)	45.82	kg
Trip Exhaust Mass US (ac)	46.25	kg
Trip Av. Amb. Temperature	77.94	deg_F
Trip Av. Humidity	46.37	%
Trip Av. GPS Altitude	221.19	m
Fuel Type	Petrol (E10)	

ave THC DC	-0.01116	ppm
ave NMHC DC	1.39860	ppm
ave CH4 DC	-1.40975	ppm
ave CO DC	46.25405	ppm
ave CO2 DC	12.41929	%
ave NOx DC	7.53792	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	0.02283	g
tot NMHC DC	0.03722	g
tot CH4 DC	0.00182	g
tot CO DC	3.00241	g
tot CO2 DC	8701.20828	g
tot NO DC (d)	0.76559	g
tot NO2 DC	0.00499	g
tot NOx DC	0.76829	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	43.97692	mi/hr
Trip Distance Share Urban	13.32761	% distance
Trip Distance Share Rural	22.66787	% distance
Trip Distance Share Motorway	64.00452	% distance

BS CO2 DC	560.90504	g/hphr
BS CO DC	0.19354	g/hphr
BS THC DC	0.00147	g/hphr
BS NMHC DC	0.00240	g/hphr
BS CH4 DC	0.00012	g/hphr
BS NO DC (d)	0.04935	g/hphr
BS NO2 DC	0.00032	g/hphr
BS NOx DC	0.04953	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	305.44197	g/mi
DS CO DC	0.10539	g/mi
DS THC DC	0.00080	g/mi
DS NMHC DC	0.00131	g/mi
DS CH4 DC	0.00006	g/mi
DS NO DC (d)	0.02687	g/mi
DS NO2 DC	0.00018	g/mi
DS NOx DC	0.02697	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	2912.62240	g/kg
FS CO DC	1.00502	g/kg
FS THC DC	0.00764	g/kg
FS NMHC DC	0.01246	g/kg
FS CH4 DC	0.00061	g/kg
FS NO DC (d)	0.25627	g/kg
FS NO2 DC	0.00167	g/kg
FS NOx DC	0.25718	g/kg
FS Soot	n/a	g/kg
FS Soot meas	n/a	g/kg
FS PM	n/a	g/kg
FS PN DC		

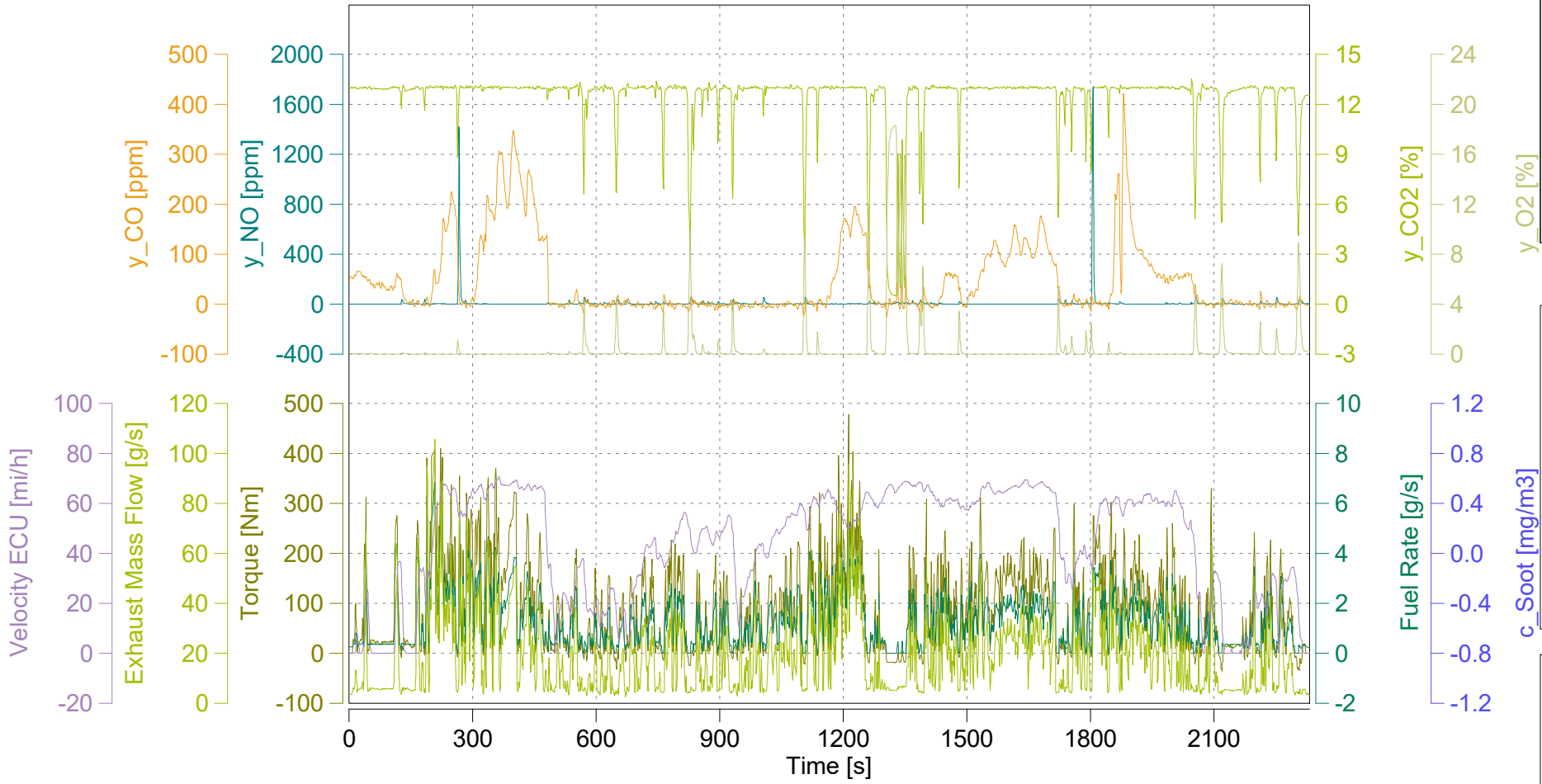
(a) GAS PEMS measurement state only, (b) based on fuel rate input (ECU, Fuel Meter), (c) Based on A/F ratio (eq 28-32 - R49)
(d) NO calculated using molecular weight of NO2, GGE=Gasoline Gallon Equivalents

Case: L447-2128
Page: Time Alignment Check

'B2 HWY WEST'
Start Date: 05/13/2021
Start Time: 09:07:53.0

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 Plo

Reset Time

Reset Al

Apply Curr

Concerto Version: 504 Build 119, Serial Number: 1604
M.O.V.E Post-Processing: DT_1R4.1_B340
Legislation:

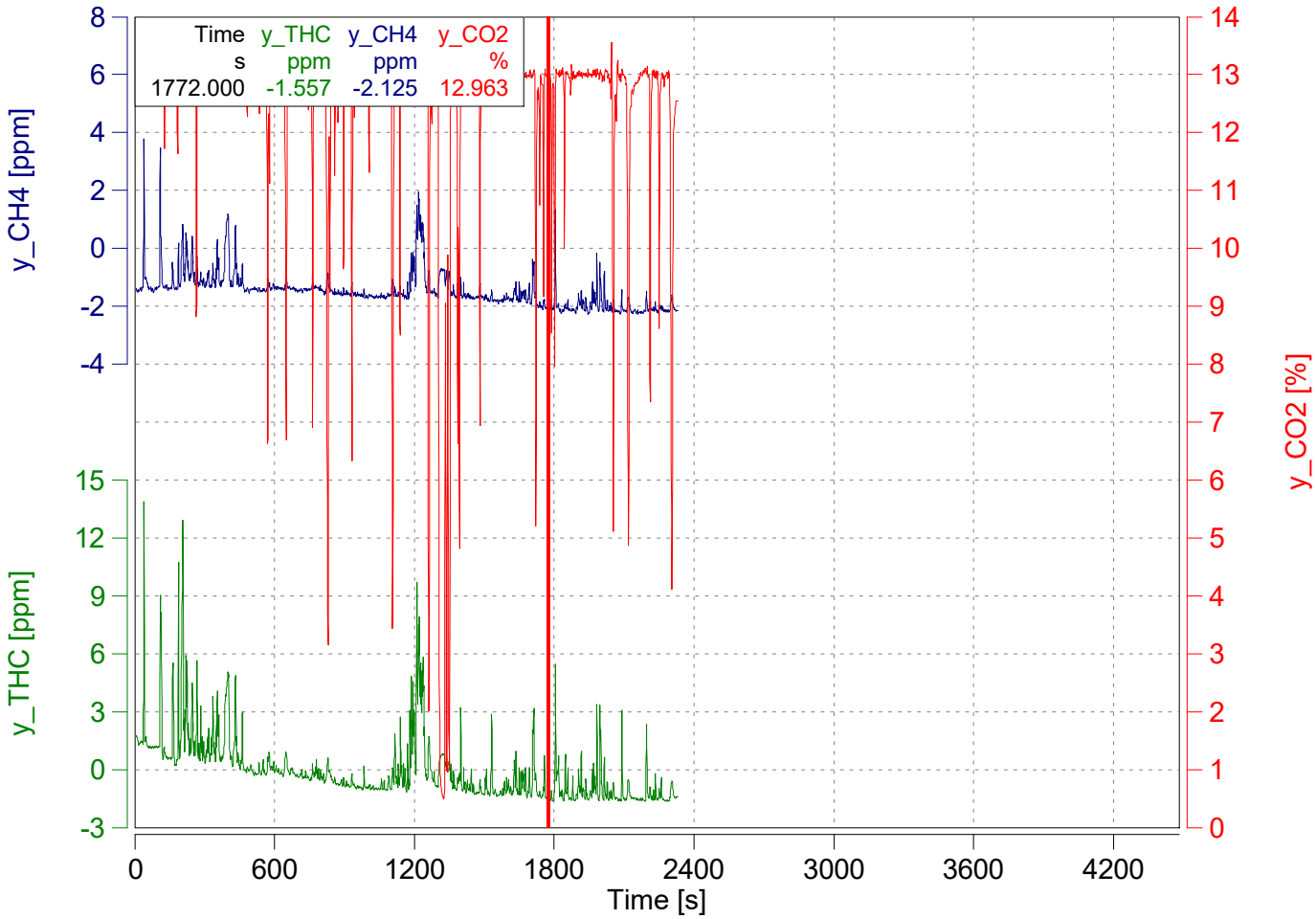
Vehicle: L447-2128 /
Engine: /
NOx Ambient Condition Corr.: 7 - CFR40 §1065.670
Dry / Wet Corr.: 2 - CFR40 §86.1342-90

Case: L447-2128
Page: Time Alignment of Gas Concentrations

'B2 HWY WEST'
Start Date: 05/13/2021
Start Time: 09:07:53.0

AVL

Concerto M.O.V.E, 2019



Absolute Time Shifts

y_THC	s	-5.2
y_CH4	s	-7.2

Reset Time Shifts in Plot

Apply Current Values

Concerto Version: 504 Build 119, Serial Number: 1604
M.O.V.E Post-Processing: DT_1R4.1_B340
Legislation:

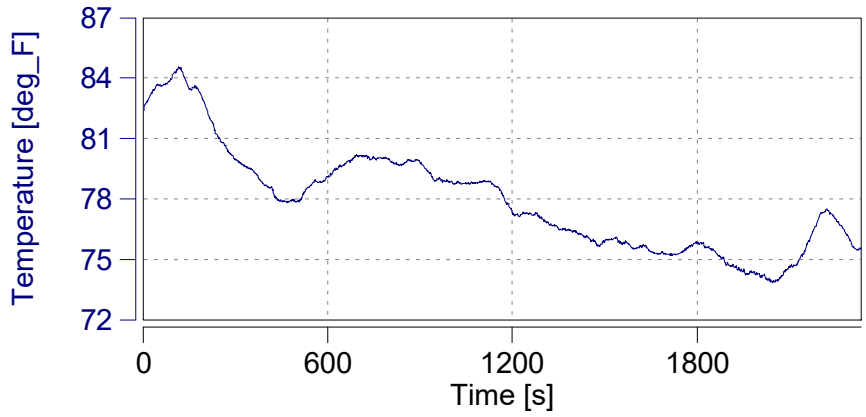
Vehicle: L447-2128 /
Engine: /
NOx Ambient Condition Corr.: 7 - CFR40 §1065.670
Dry / Wet Corr.: 2 - CFR40 §86.1342-90

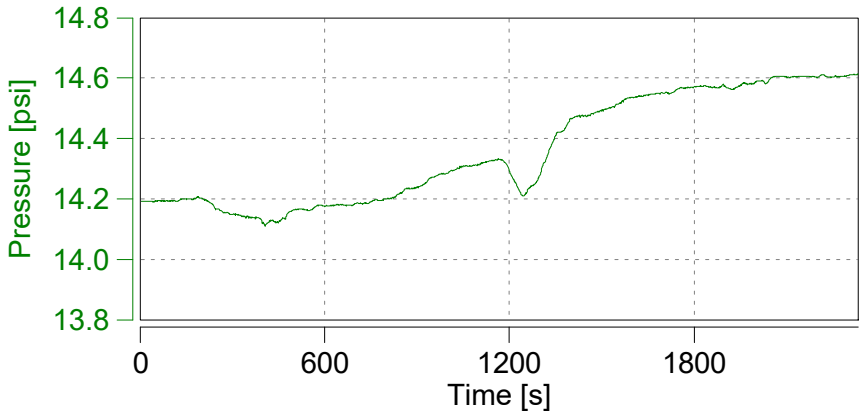
Case: L447-2128
Page: Ambient Conditions

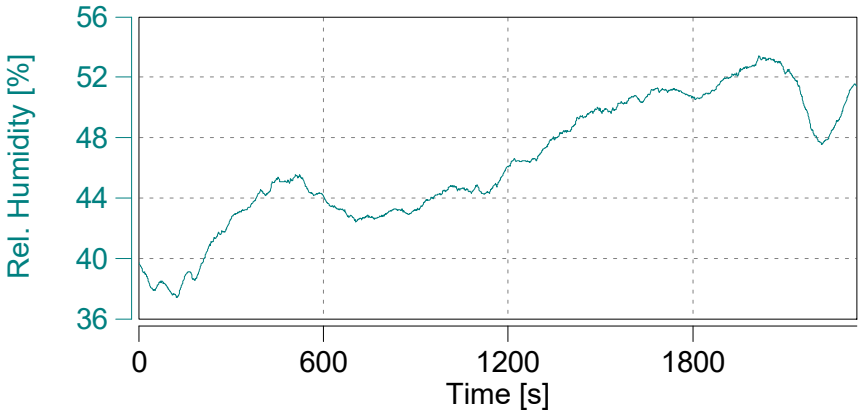
'B2 HWY WEST'
Start Date: 05/13/2021
Start Time: 09:07:53.0

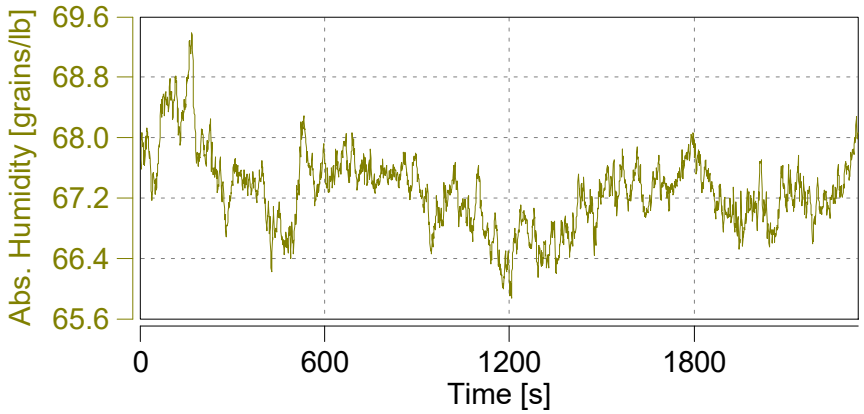
AVL

Concerto M.O.V.E, 2019









Concerto Version: 504 Build 119, Serial Number: 1604
M.O.V.E Post-Processing: DT_1R4.1_B340
Legislation:

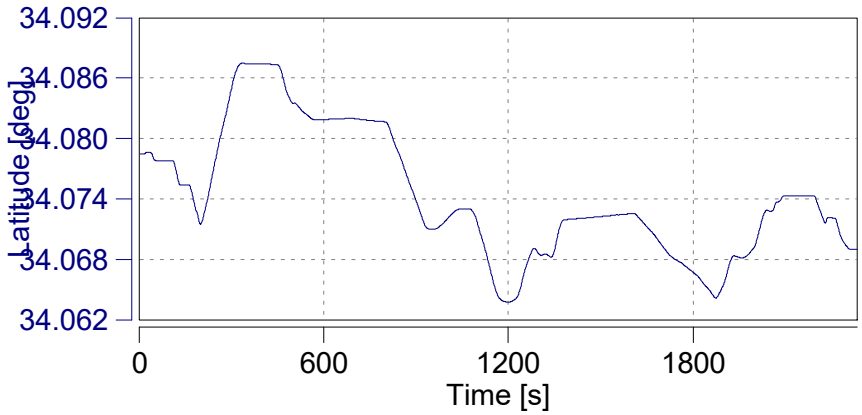
Vehicle: L447-2128 /
Engine: /
NOx Ambient Condition Corr.: 7 - CFR40 §1065.670
Dry / Wet Corr.: 2 - CFR40 §86.1342-90

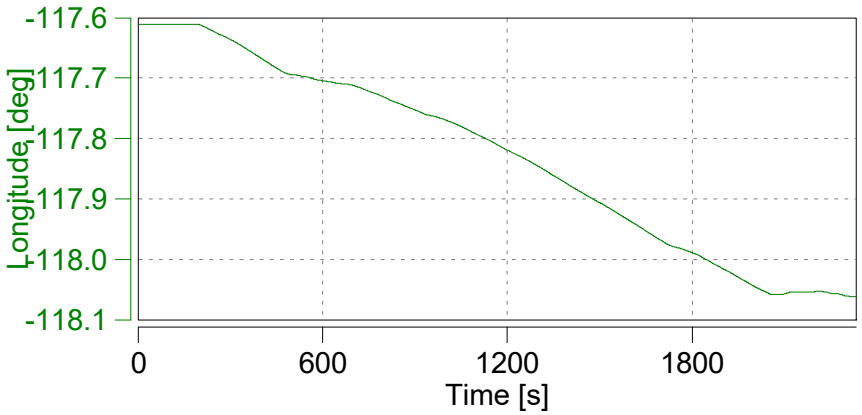
Case: L447-2128
Page: GPS

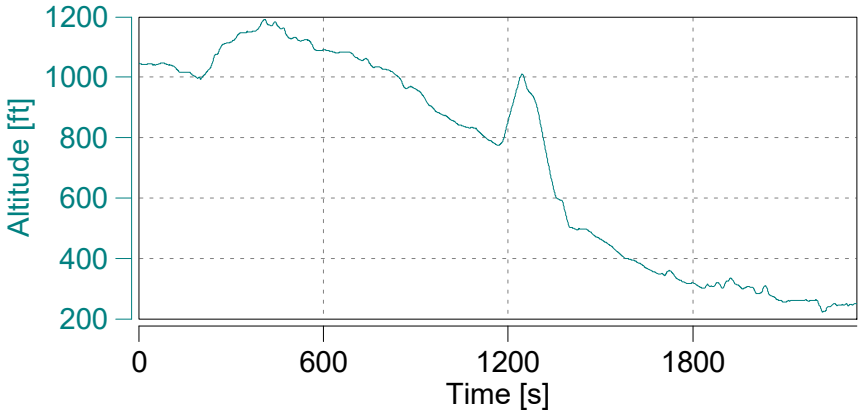
'B2 HWY WEST'
Start Date: 05/13/2021
Start Time: 09:07:53.0

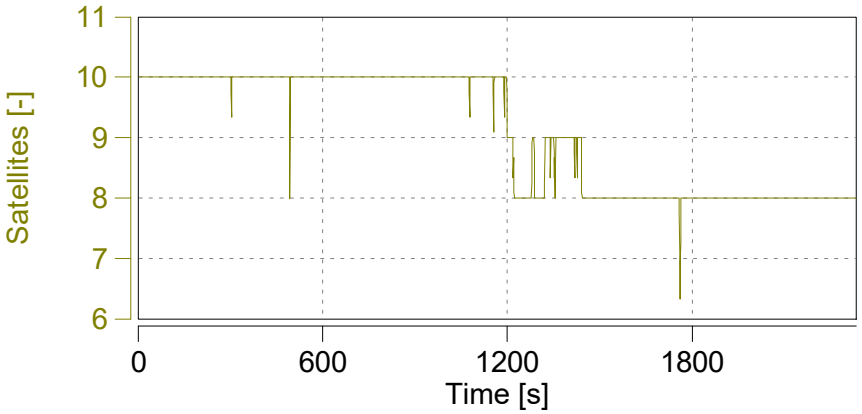
AVL

Concerto M.O.V.E, 2019









Concerto Version: 504 Build 119, Serial Number: 1604
M.O.V.E Post-Processing: DT_1R4.1_B340
Legislation:

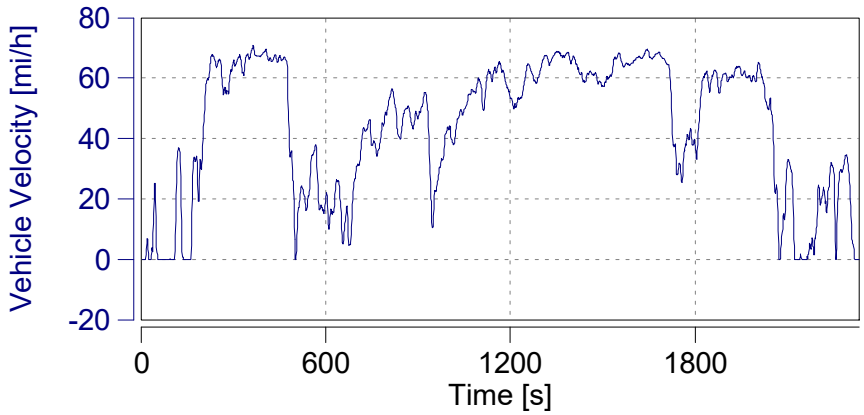
Vehicle: L447-2128 /
Engine: /
NOx Ambient Condition Corr.: 7 - CFR40 §1065.670
Dry / Wet Corr.: 2 - CFR40 §86.1342-90

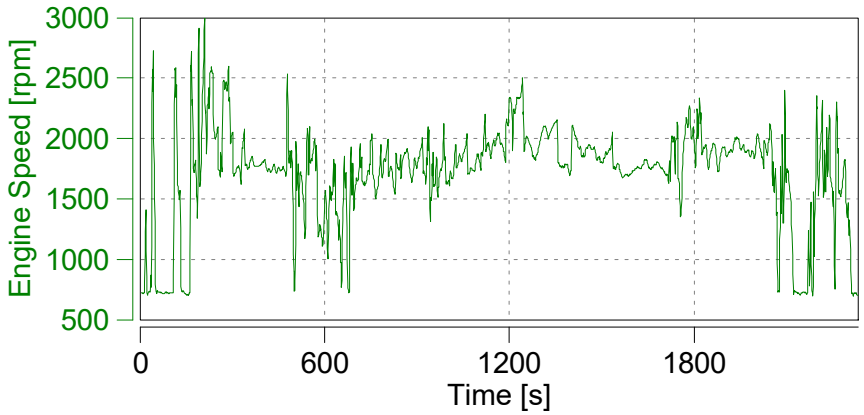
Case: L447-2128
Page: Engine (1)

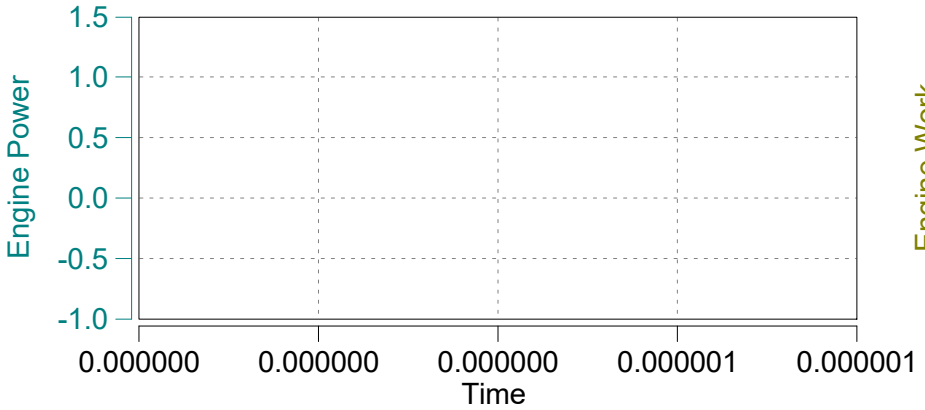
'B2 HWY WEST'
Start Date: 05/13/2021
Start Time: 09:07:53.0

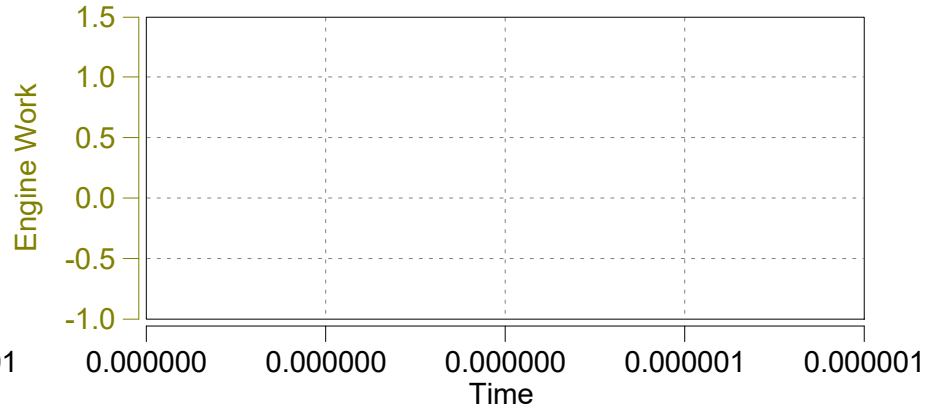
AVL

Concerto M.O.V.E, 2019









Concerto Version: 504 Build 119, Serial Number: 1604
M.O.V.E Post-Processing: DT_1R4.1_B340
Legislation:

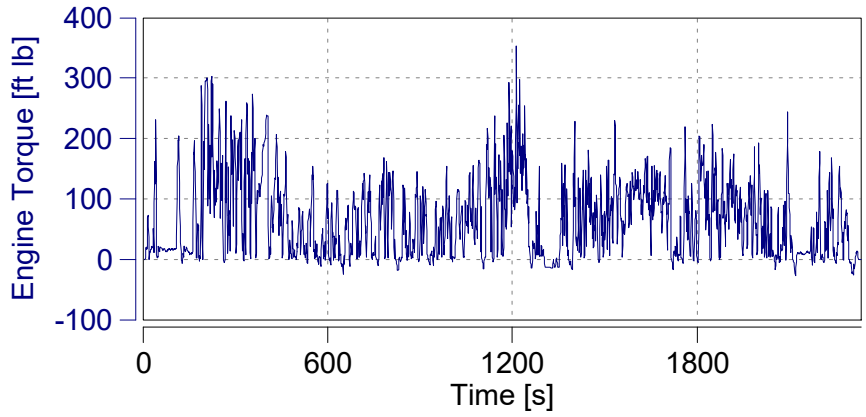
Vehicle: L447-2128 /
Engine: /
NOx Ambient Condition Corr.: 7 - CFR40 §1065.670
Dry / Wet Corr.: 2 - CFR40 §86.1342-90

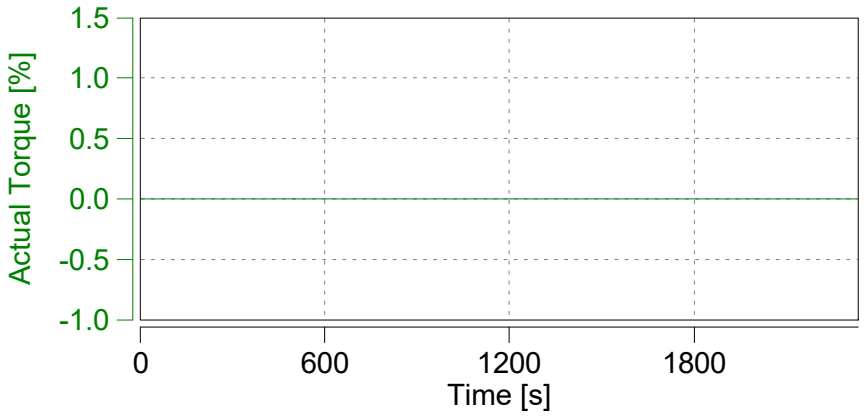
Case: L447-2128
Page: Engine (2)

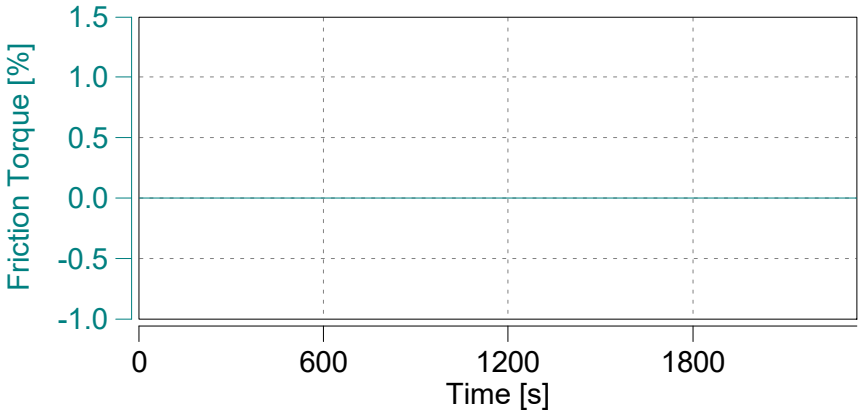
'B2 HWY WEST'
Start Date: 05/13/2021
Start Time: 09:07:53.0

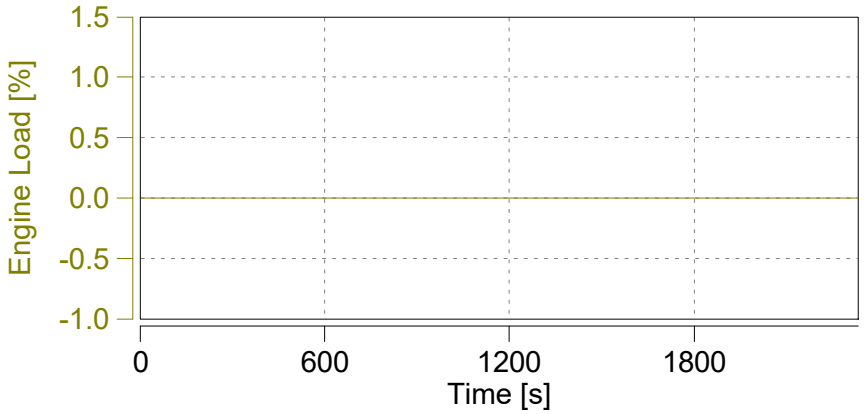
AVL

Concerto M.O.V.E, 2019









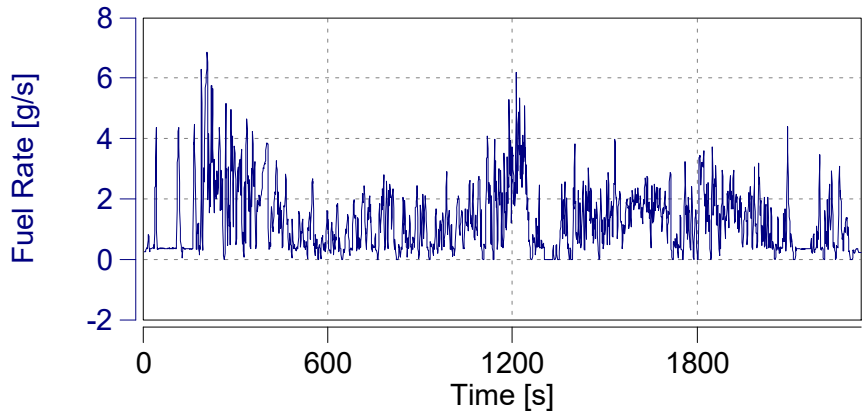
Concerto Version: 504 Build 119, Serial Number: 1604
M.O.V.E Post-Processing: DT_1R4.1_B340
Legislation:

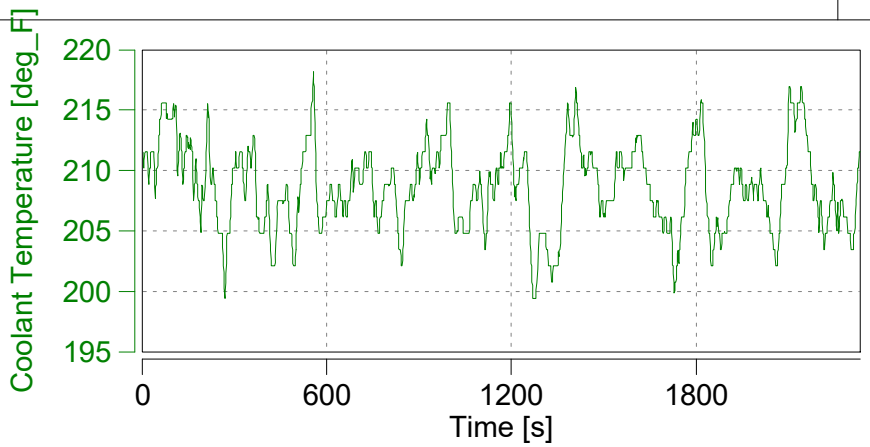
Vehicle: L447-2128 /
Engine: /
NOx Ambient Condition Corr.: 7 - CFR40 §1065.670
Dry / Wet Corr.: 2 - CFR40 §86.1342-90

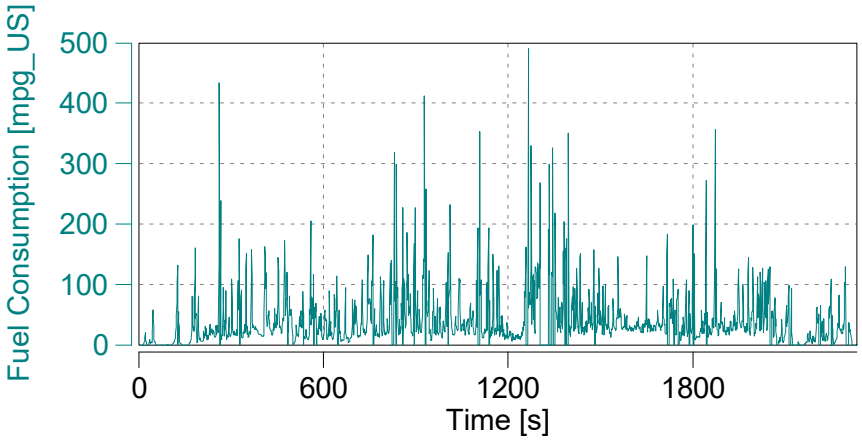
'B2 HWY WEST'
Start Date: 05/13/2021
Start Time: 09:07:53.0

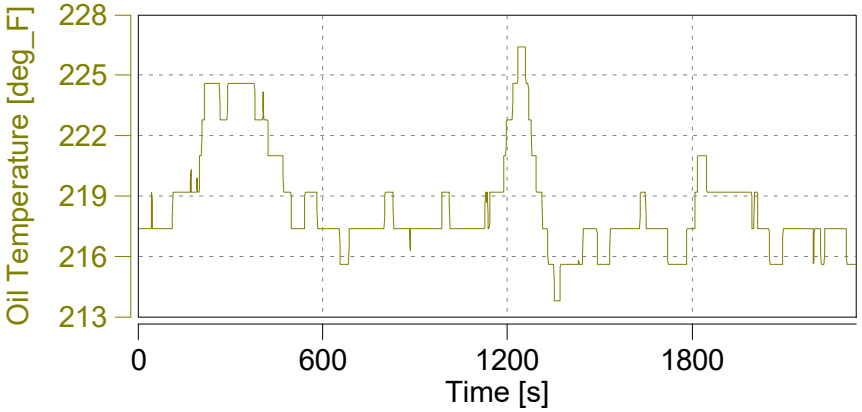
AVL

Concerto M.O.V.E, 2019







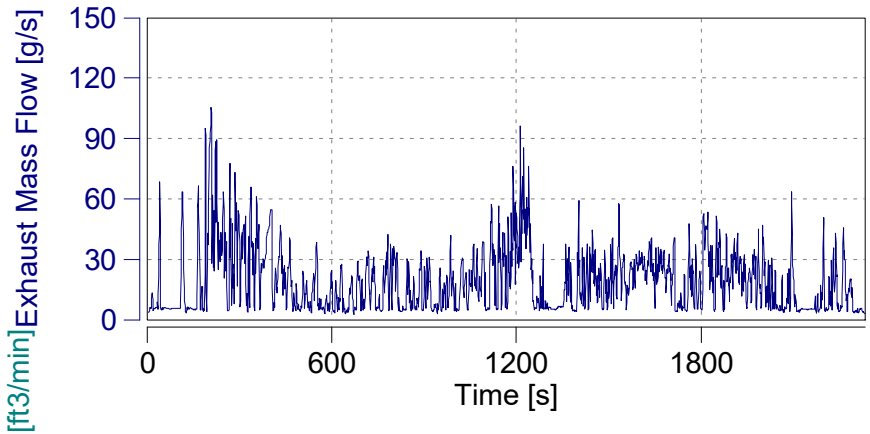


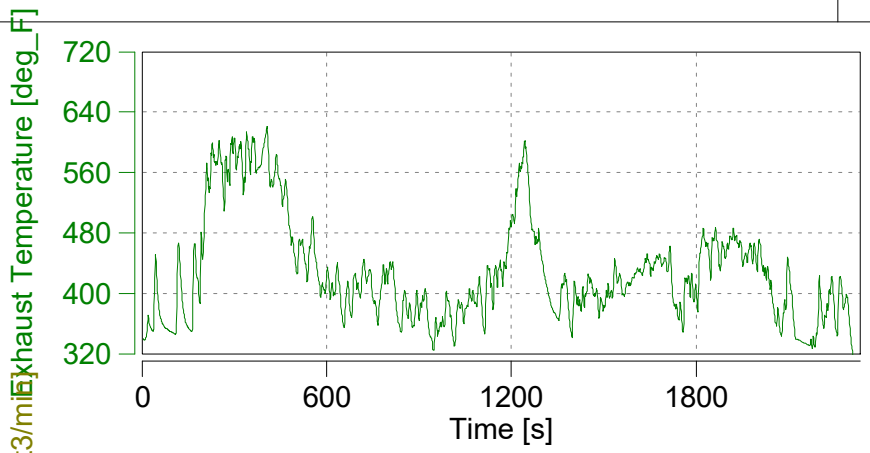
Case: L447-2128
Page: Exhaust Flow (1)

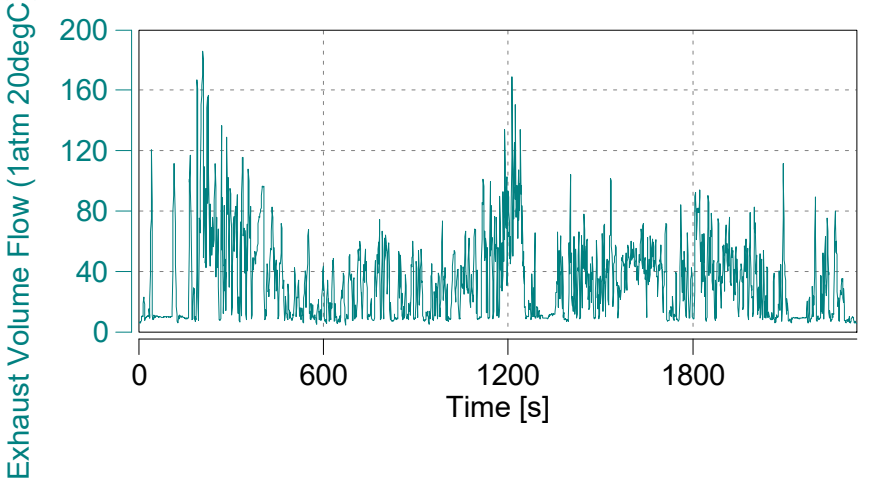
'B2 HWY WEST'
Start Date: 05/13/2021
Start Time: 09:07:53.0

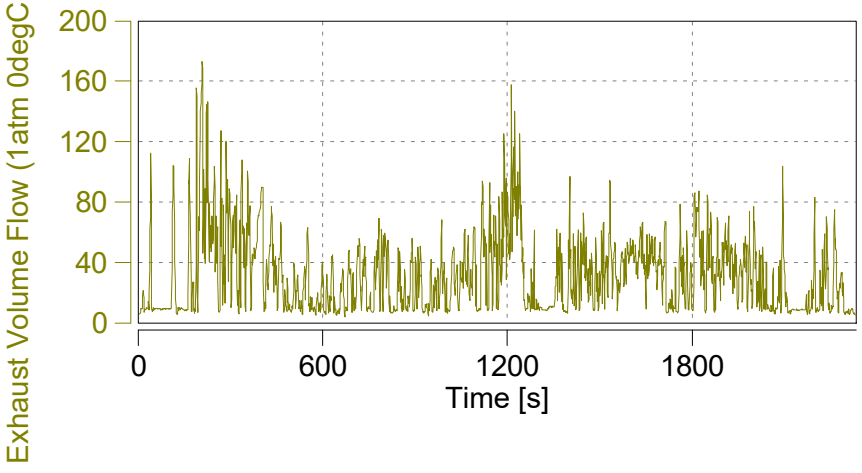
AVL

Concerto M.O.V.E, 2019









Concerto Version: 504 Build 119, Serial Number: 1604
M.O.V.E Post-Processing: DT_1R4.1_B340
Legislation:

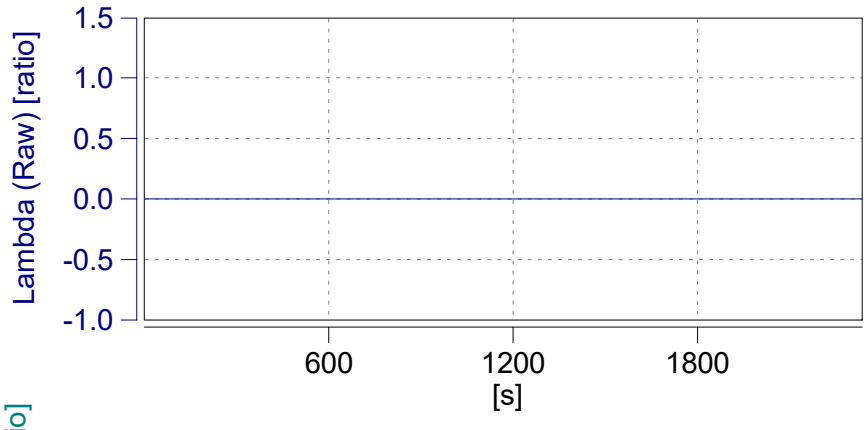
Vehicle: L447-2128 /
Engine: /
NOx Ambient Condition Corr.: 7 - CFR40 §1065.670
Dry / Wet Corr.: 2 - CFR40 §86.1342-90

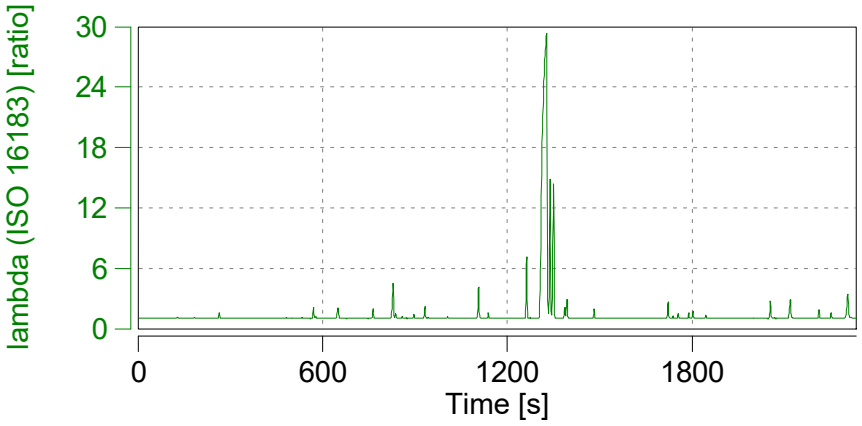
Case: L447-2128
Page: Exhaust Flow (2)

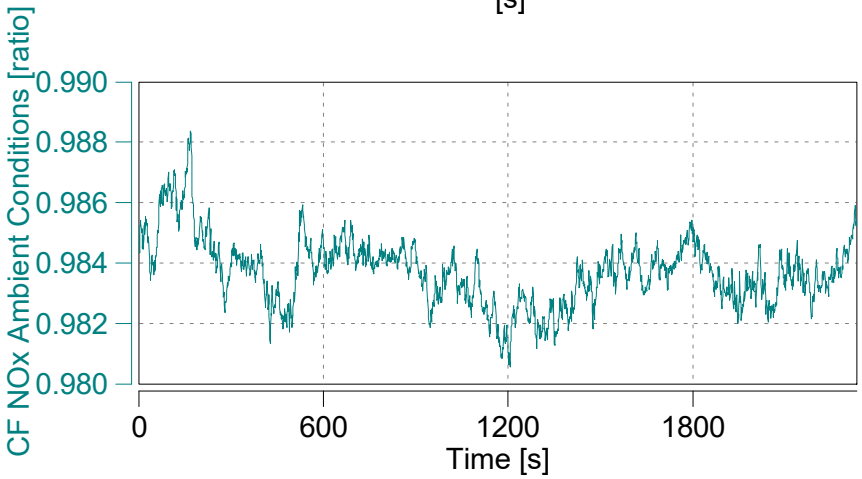
'B2 HWY WEST'
Start Date: 05/13/2021
Start Time: 09:07:53.0

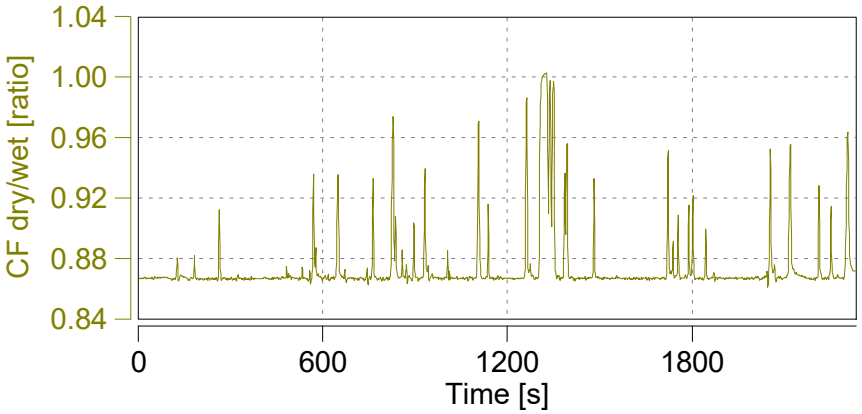
AVL

Concerto M.O.V.E, 2019









Concerto Version: 504 Build 119, Serial Number: 1604
M.O.V.E Post-Processing: DT_1R4.1_B340
Legislation:

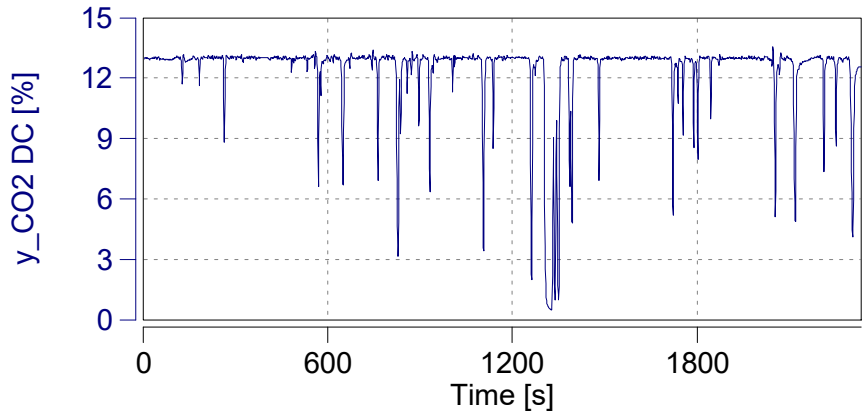
Vehicle: L447-2128 /
Engine: /
NOx Ambient Condition Corr.: 7 - CFR40 §1065.670
Dry / Wet Corr.: 2 - CFR40 §86.1342-90

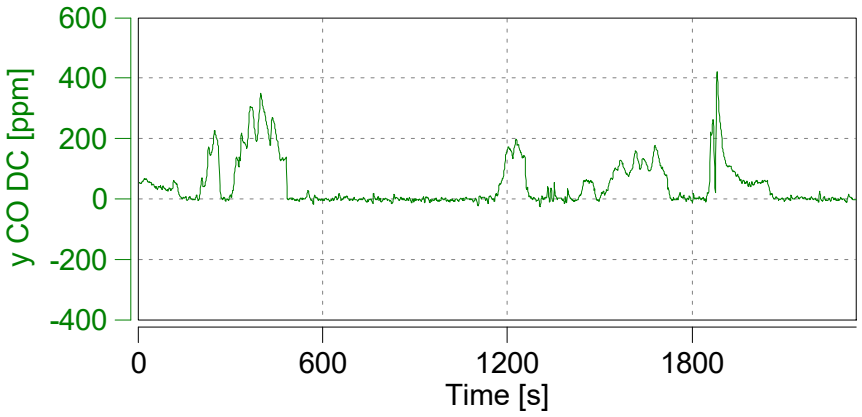
Case: L447-2128
Page: Corrected Emissions (1)

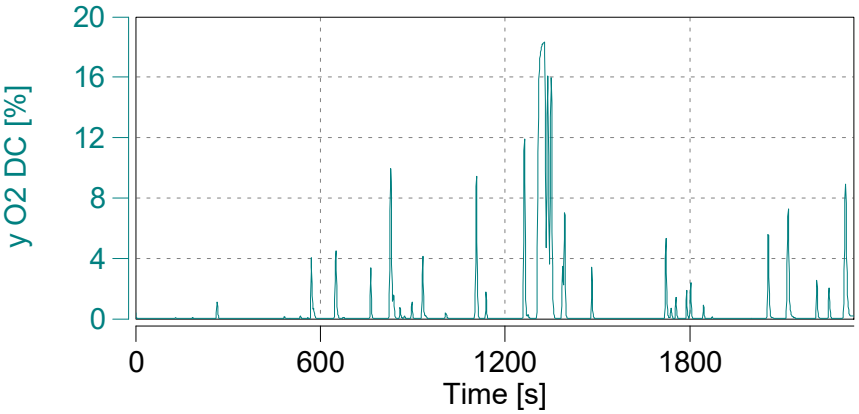
'B2 HWY WEST'
Start Date: 05/13/2021
Start Time: 09:07:53.0

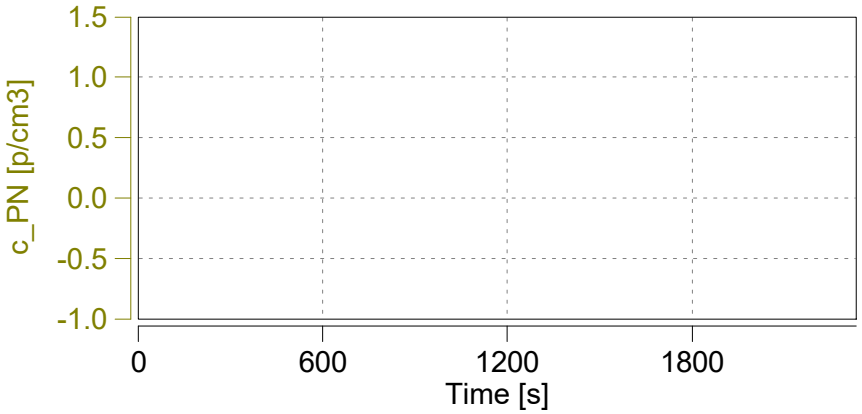
AVL

Concerto M.O.V.E, 2019









Concerto Version: 504 Build 119, Serial Number: 1604
M.O.V.E Post-Processing: DT_1R4.1_B340
Legislation:

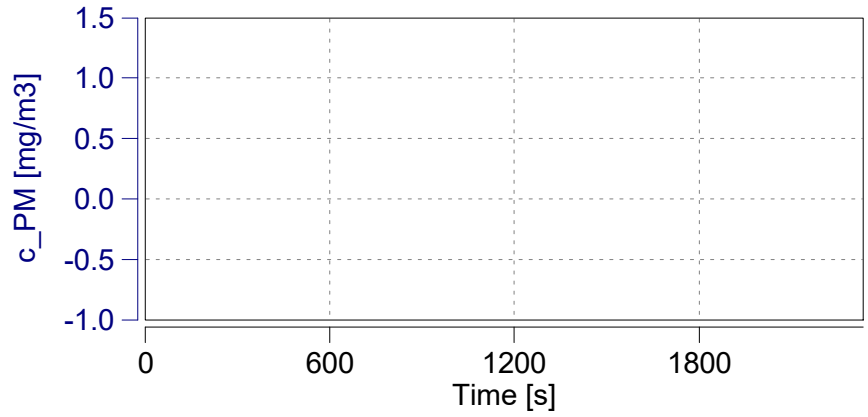
Vehicle: L447-2128 /
Engine: /
NOx Ambient Condition Corr.: 7 - CFR40 §1065.670
Dry / Wet Corr.: 2 - CFR40 §86.1342-90

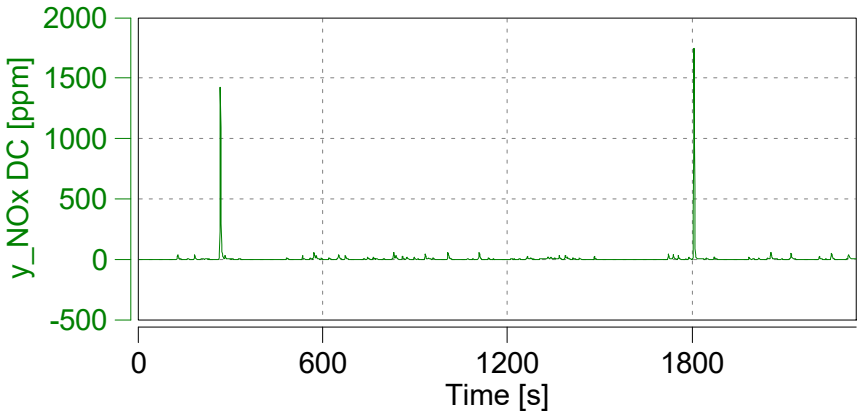
Case: L447-2128
Page: Corrected Emissions (2)

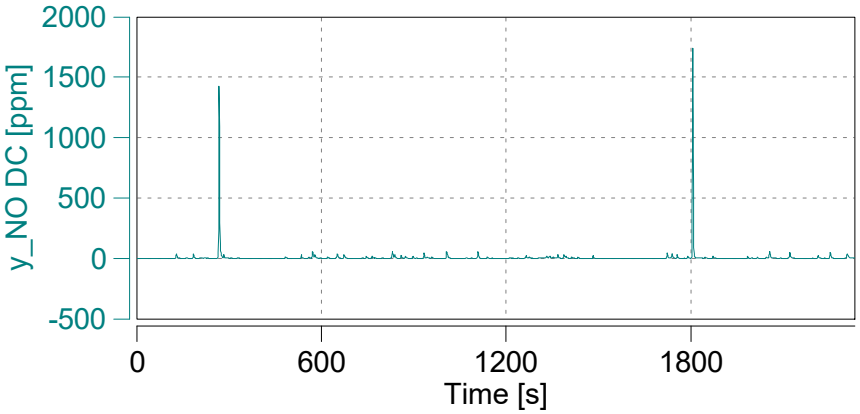
'B2 HWY WEST'
Start Date: 05/13/2021
Start Time: 09:07:53.0

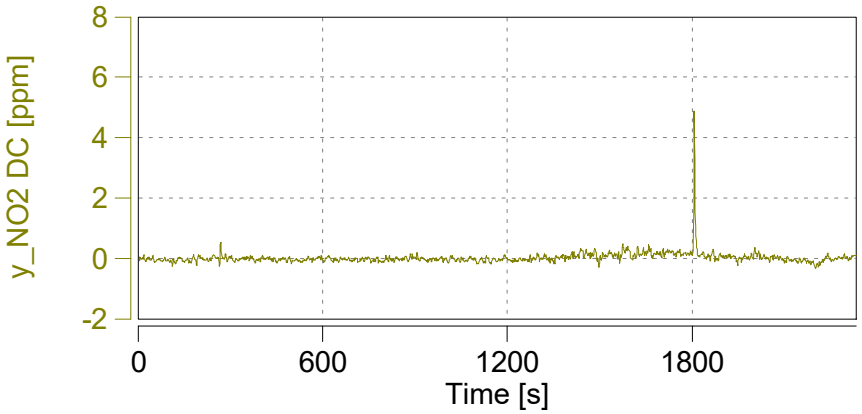
AVL

Concerto M.O.V.E, 2019









Concerto Version: 504 Build 119, Serial Number: 1604
M.O.V.E Post-Processing: DT_1R4.1_B340
Legislation:

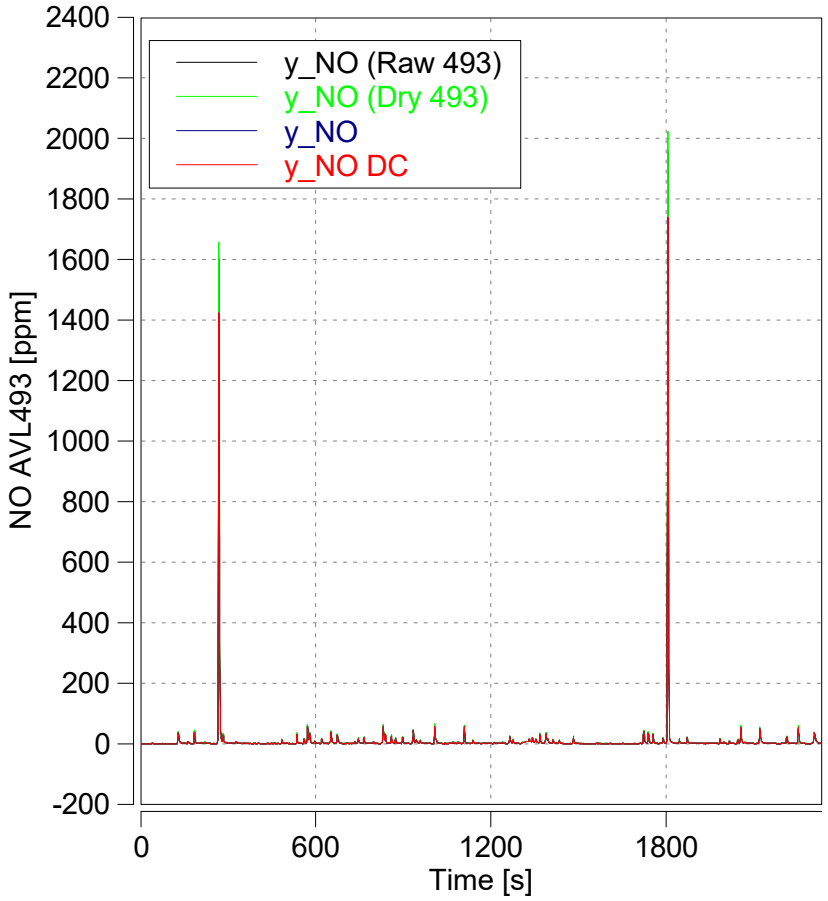
Vehicle: L447-2128 /
Engine: /
NOx Ambient Condition Corr.: 7 - CFR40 §1065.670
Dry / Wet Corr.: 2 - CFR40 §86.1342-90

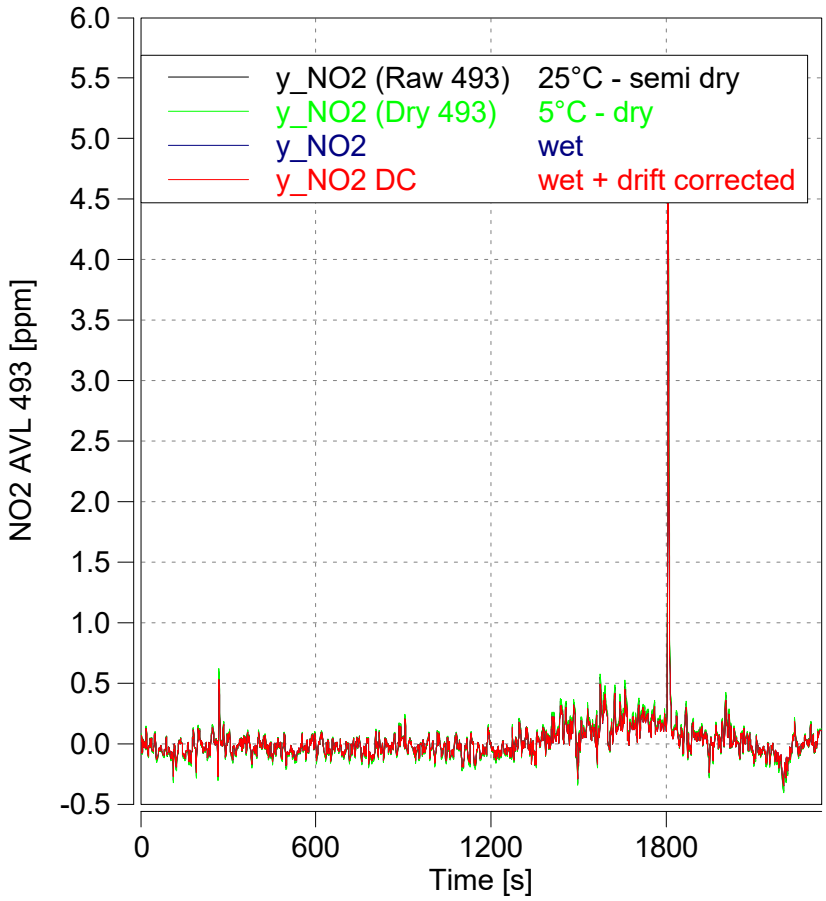
Case: L447-2128
Page: Corrected Emissions (3)

'B2 HWY WEST'
Start Date: 05/13/2021
Start Time: 09:07:53.0

AVL

Concerto M.O.V.E, 2019

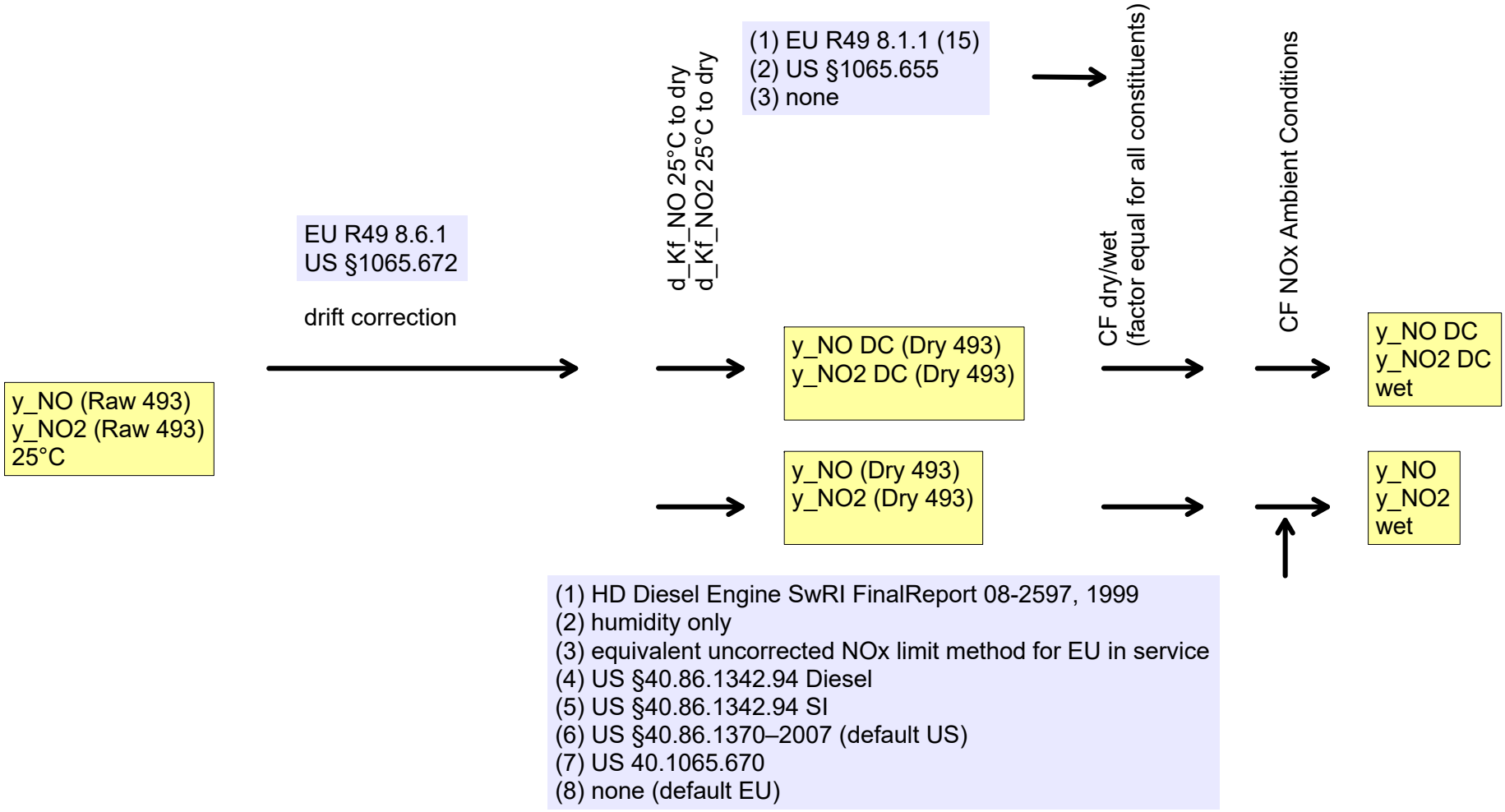




Concerto Version: 504 Build 119, Serial Number: 1604
M.O.V.E Post-Processing: DT_1R4.1_B340
Legislation:

Vehicle: L447-2128 /
Engine: /
NOx Ambient Condition Corr.: 7 - CFR40 §1065.670
Dry / Wet Corr.: 2 - CFR40 §86.1342-90

NOx - AVL 493

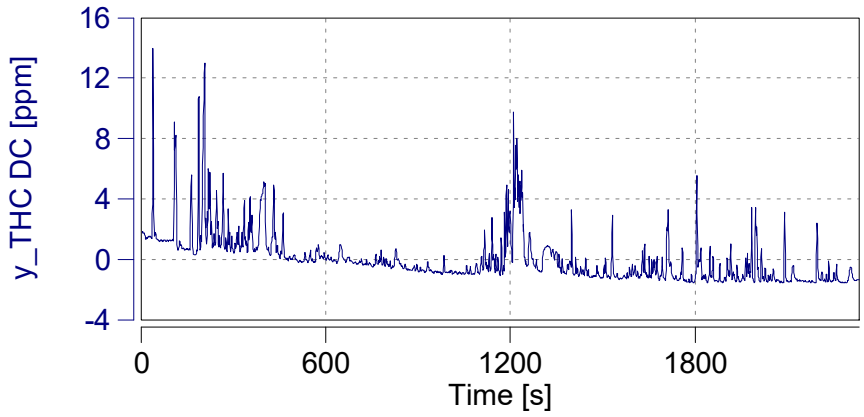

y_NO (Raw 493)
y_NO2 (Raw 493)
25°C
EU R49 8.6.1
US §1065.672
drift correction
d_Kf_NO 25°C to dry
d_Kf_NO2 25°C to dry
(1) EU R49 8.1.1 (15)
(2) US §1065.655
(3) none
y_NO DC (Dry 493)
y_NO2 DC (Dry 493)
y_NO (Dry 493)
y_NO2 (Dry 493)
CF dry/wet
(factor equal for all constituents)
CF NOx Ambient Conditions
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)

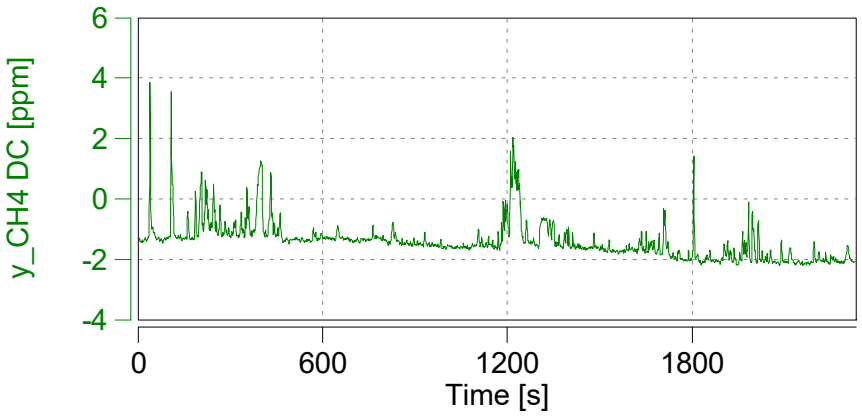
Case: L447-2128
Page: Corrected Emissions (5)

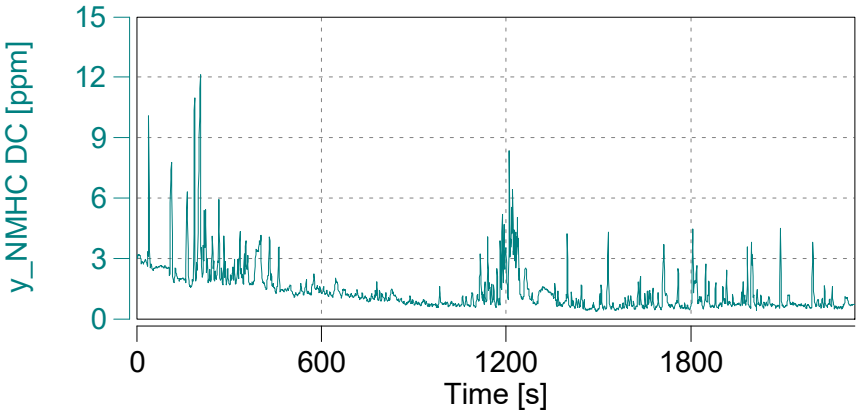
'B2 HWY WEST'
Start Date: 05/13/2021
Start Time: 09:07:53.0

AVL

Concerto M.O.V.E, 2019







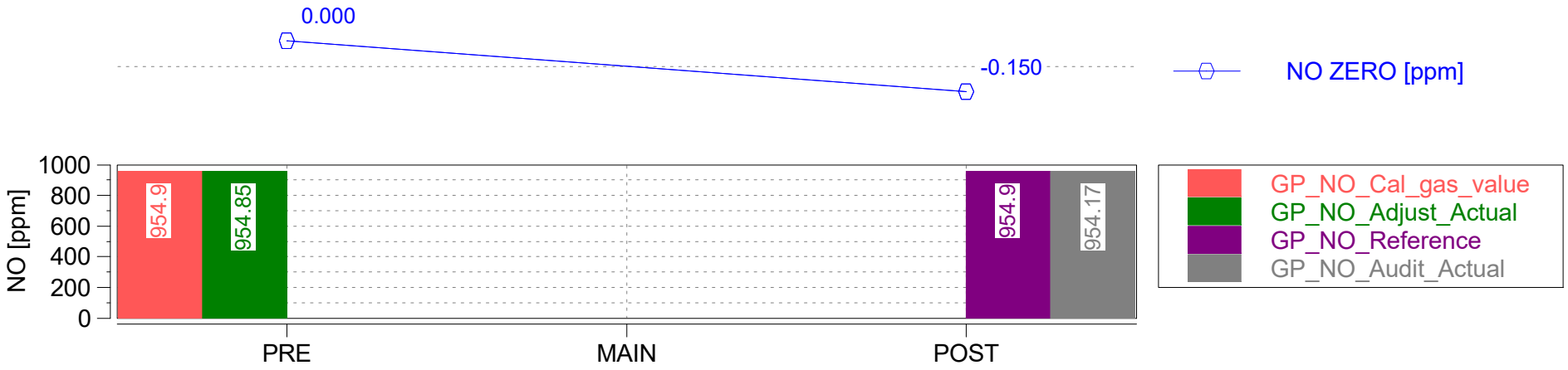
Concerto Version: 504 Build 119, Serial Number: 1604
M.O.V.E Post-Processing: DT_1R4.1_B340
Legislation:

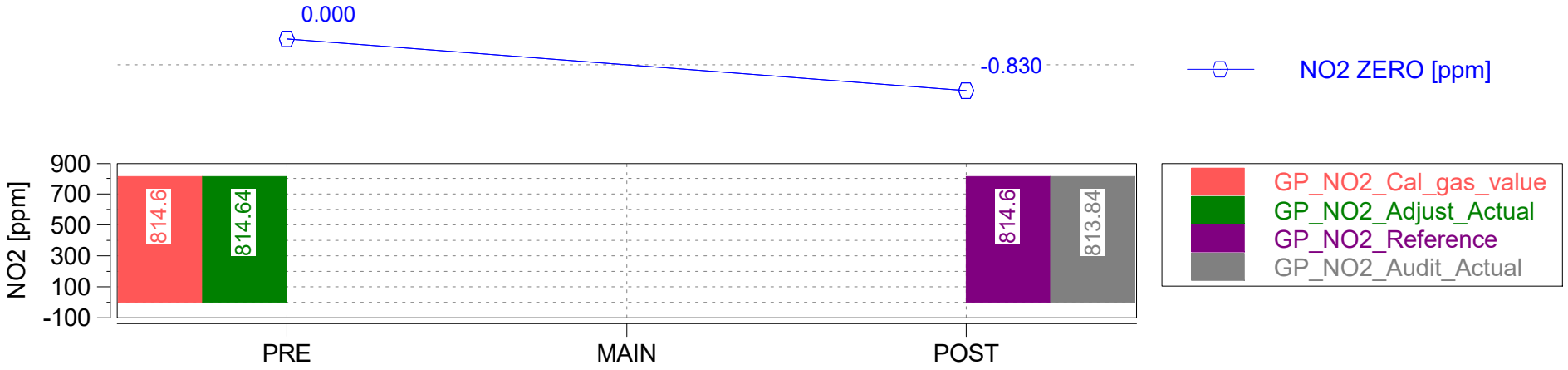
Vehicle: L447-2128 /
Engine: /
NOx Ambient Condition Corr.: 7 - CFR40 §1065.670
Dry / Wet Corr.: 2 - CFR40 §86.1342-90

Case: L447-2128
Page: NO/NO2/NOx Zero - Span

'B2 HWY WEST'
Start Date: 05/13/2021
Start Time: 09:07:53.0

AVL
Concerto M.O.V.E, 2019





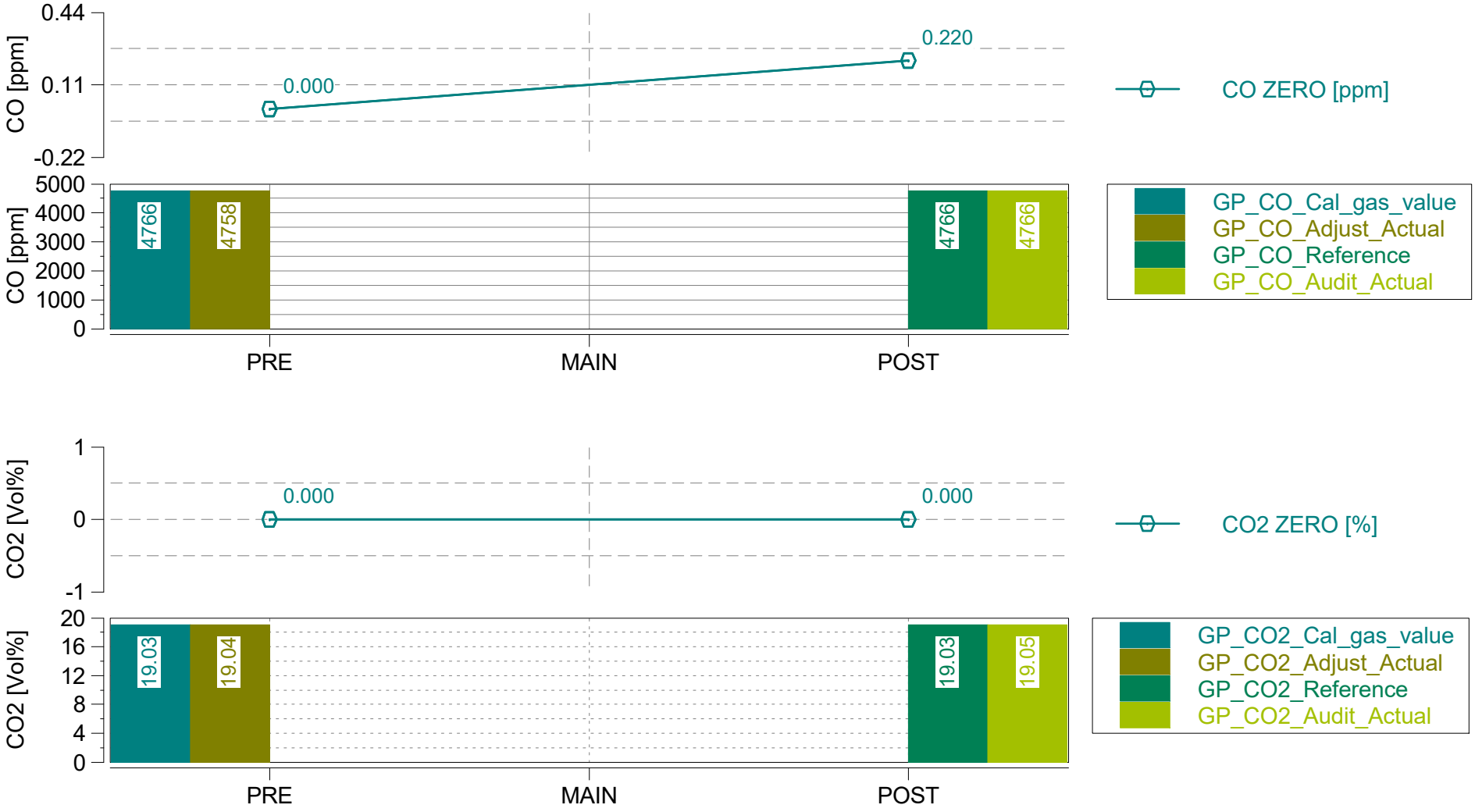
Concerto Version: 504 Build 119, Serial Number: 1604
M.O.V.E Post-Processing: DT_1R4.1_B340
Legislation:

Vehicle: L447-2128 /
Engine: /
NOx Ambient Condition Corr.: 7 - CFR40 §1065.670
Dry / Wet Corr.: 2 - CFR40 §86.1342-90

Case: L447-2128
Page: CO/CO2 Zero - Span

'B2 HWY WEST'
Start Date: 05/13/2021
Start Time: 09:07:53.0

AVL
Concerto M.O.V.E, 2019



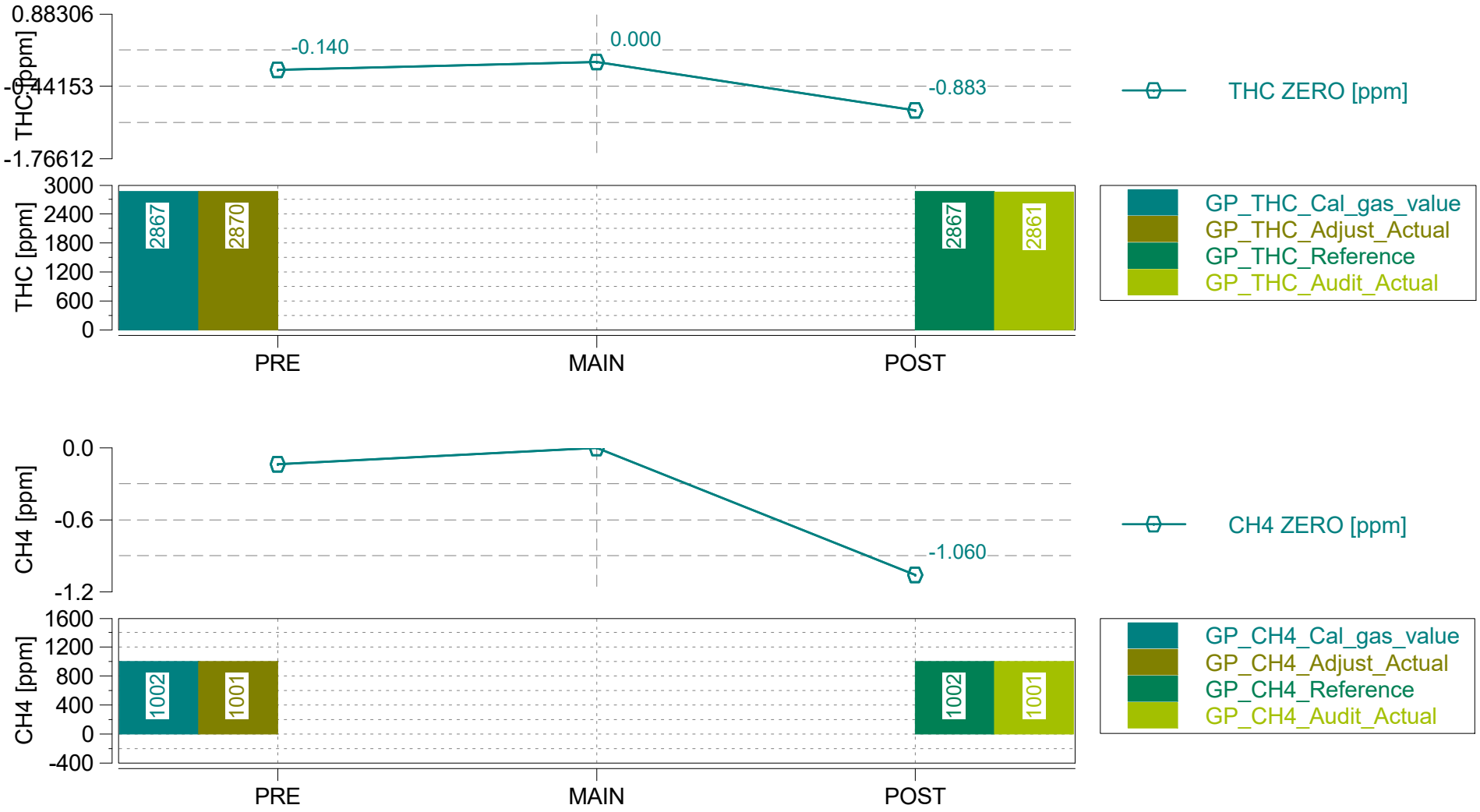
Concerto Version: 504 Build 119, Serial Number: 1604
M.O.V.E Post-Processing: DT_1R4.1_B340
Legislation:

Vehicle: L447-2128 /
Engine: /
NOx Ambient Condition Corr.: 7 - CFR40 §1065.670
Dry / Wet Corr.: 2 - CFR40 §86.1342-90

Case: L447-2128
Page: THC/CH4 Zero - Span

'B2 HWY WEST'
Start Date: 05/13/2021
Start Time: 09:07:53.0

AVL
Concerto M.O.V.E, 2019



Concerto Version: 504 Build 119, Serial Number: 1604
M.O.V.E Post-Processing: DT_1R4.1_B340
Legislation:

Vehicle: L447-2128 /
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%	**0.07**	**%**	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	0597
Firmware Version	V1.16
Main Test Date	2021-05-13
Leak Check Age [days]	0

Device ID	AVL4925
Serial Number	175
Firmware Version	1.20.0.8

EFM

Device ID	AVL495
Serial Number	00915
Serial Number Tube	01115
Firmware Version	V1.13

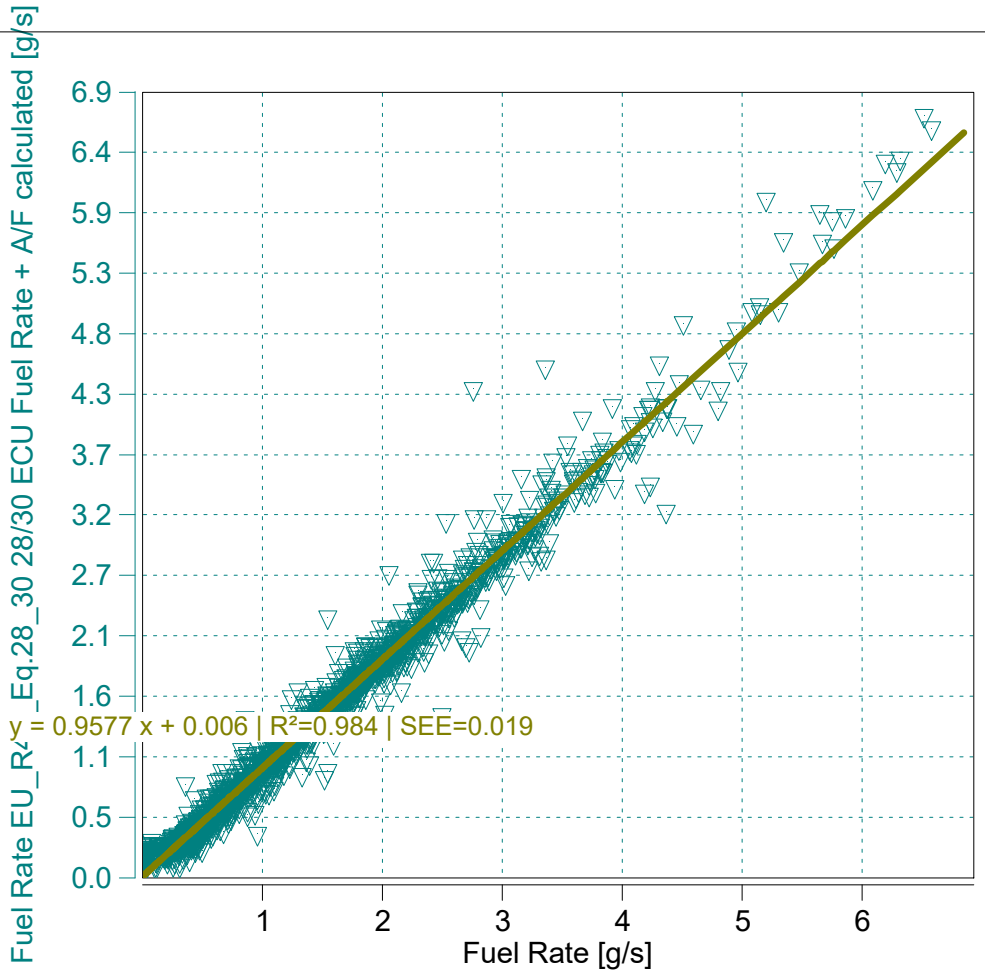
System Control

SC Version	V2.6_212
SC Serial Number	60300923

Case: L447-2128
Page: Fuel Rate ECU vs. Calculated

'B2 HWY WEST'
Start Date: 05/13/2021
Start Time: 09:07:53.0

AVL
Concerto M.O.V.E, 2019



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

y = 0.9577 x + 0.006 | R²=0.984 | SEE=0.019
m = 0.96 (0.9 - 1.1 recommended)
R² = 0.98 (min 0.9 mandatory)

Data from - to [% of Maximum]

0 100

Concerto Version: 504 Build 119, Serial Number: 1604
M.O.V.E Post-Processing: DT_1R4.1_B340
Legislation:

Vehicle: L447-2128 /
Engine: /
NOx Ambient Condition Corr.: 7 - CFR40 §1065.670
Dry / Wet Corr.: 2 - CFR40 §86.1342-90

Case: L447-2128
Page: Trip Summary

'A2 Mountain Uphill'
Start Date: 05/13/2021
Start Time: 09:07:53.0

AVL
Concerto M.O.V.E, 2019

Trip Duration	1886.00	s
Trip Duration (a)	1886.00	s
Trip Distance	17.14	mi
Trip Distance (a)	17.14	mi
Trip Fuel Cons. (b)	3.66	kg
Trip Fuel Cons. (ab)	3.66	kg
Trip Fuel Cons. EU (ac)	3.55	kg
Trip Fuel Cons. US (ac)	3.52	kg
Trip Fuel Economy (b)	13.24	mpg_US
Trip Fuel Economy (ab)	13.24	mpg_US
Trip Fuel Economy EU (ac)	13.68	mpg_US
Trip Fuel Economy US (ac)	13.80	mpg_US
Trip Fuel Economy GGE (b)	13.24	mpg_US
Trip Fuel Economy GGE (ab)	13.24	mpg_US
Trip Fuel Economy EU GGE (ac)	13.68	mpg_US
Trip Fuel Economy US GGE (ac)	13.80	mpg_US
Trip Av. Eng. Speed	1835.49	rpm
Trip Av. Torque	97.96	lbft
Trip Av. Power	39.91	hp
Trip Work		
Trip Work (a)	20.91	hphr
Trip Exhaust Mass	54.13	kg
Trip Exhaust Mass EU (ac)	55.84	kg
Trip Exhaust Mass US (ac)	56.33	kg
Trip Av. Amb. Temperature	74.58	deg_F
Trip Av. Humidity	48.16	%
Trip Av. GPS Altitude	589.17	m
Fuel Type	Petrol (E10)	

ave THC	13.55854	ppm
ave NMHC	14.33993	ppm
ave CH4	-0.78138	ppm
ave CO	127.73178	ppm
ave CO2	12.78676	%
ave NOx	3.73360	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	0.36655	g
tot NMHC	0.35474	g
tot CH4	0.00348	g
tot CO	8.26609	g
tot CO2	10694.24565	g
tot NO (d)	0.27707	g
tot NO2	0.02320	g
tot NOx	0.29507	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	32.72038	mi/hr
Trip Distance Share Urban	28.74055	% distance
Trip Distance Share Rural	71.25945	% distance
Trip Distance Share Motorway	0.00000	% distance

BS CO2	511.44151	g/hphr
BS CO	0.39532	g/hphr
BS THC	0.01753	g/hphr
BS NMHC	0.01697	g/hphr
BS CH4	0.00017	g/hphr
BS NO (d)	0.01325	g/hphr
BS NO2	0.00111	g/hphr
BS NOx	0.01411	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	623.86788	g/mi
DS CO	0.48222	g/mi
DS THC	0.02138	g/mi
DS NMHC	0.02069	g/mi
DS CH4	0.00020	g/mi
DS NO (d)	0.01616	g/mi
DS NO2	0.00135	g/mi
DS NOx	0.01721	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	2918.43522	g/kg
FS CO	2.25580	g/kg
FS THC	0.10003	g/kg
FS NMHC	0.09681	g/kg
FS CH4	0.00095	g/kg
FS NO (d)	0.07561	g/kg
FS NO2	0.00633	g/kg
FS NOx	0.08052	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: 504 Build 119, Serial Number: 1604
M.O.V.E Post-Processing: DT_1R4.1_B340
Legislation:

Vehicle: L447-2128 /
Engine: /
NOx Ambient Condition Corr.: 7 - CFR40 §1065.670
Dry / Wet Corr.: 2 - CFR40 §86.1342-90

Case: L447-2128
Page: Trip Summary Drift Corrected

'A2 Mountain Uphill'
Start Date: 05/13/2021
Start Time: 09:07:53.0

AVL
Concerto M.O.V.E, 2019

Trip Duration	1886.00	s
Trip Duration (a)	1886.00	s
Trip Distance	17.14	mi
Trip Distance (a)	17.14	mi
Trip Fuel Cons. (b)	3.66	kg
Trip Fuel Cons. (ab)	3.66	kg
Trip Fuel Cons. EU (ac)	3.55	kg
Trip Fuel Cons. US (ac)	3.52	kg
Trip Fuel Economy (b)	13.24	mpg_US
Trip Fuel Economy (ab)	13.24	mpg_US
Trip Fuel Economy EU (ac)	13.68	mpg_US
Trip Fuel Economy US (ac)	13.80	mpg_US
Trip Fuel Economy GGE (b)	13.24	mpg_US
Trip Fuel Economy GGE (ab)	13.24	mpg_US
Trip Fuel Economy EU GGE (ac)	13.68	mpg_US
Trip Fuel Economy US GGE (ac)	13.80	mpg_US
Trip Av. Eng. Speed	1835.49	rpm
Trip Av. Torque	97.96	lbft
Trip Av. Power	39.91	hp
Trip Work		
Trip Work (a)	20.91	hphr
Trip Exhaust Mass	54.13	kg
Trip Exhaust Mass EU (ac)	55.84	kg
Trip Exhaust Mass US (ac)	56.33	kg
Trip Av. Amb. Temperature	74.58	deg_F
Trip Av. Humidity	48.16	%
Trip Av. GPS Altitude	589.17	m
Fuel Type	Petrol (E10)	

ave THC DC	13.63439	ppm
ave NMHC DC	14.34767	ppm
ave CH4 DC	-0.71328	ppm
ave CO DC	127.82605	ppm
ave CO2 DC	12.77669	%
ave NOx DC	3.73514	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	0.36807	g
tot NMHC DC	0.35493	g
tot CH4 DC	0.00383	g
tot CO DC	8.27219	g
tot CO2 DC	10685.82278	g
tot NO DC (d)	0.27718	g
tot NO2 DC	0.02321	g
tot NOx DC	0.29519	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	32.72038	mi/hr
Trip Distance Share Urban	28.74055	% distance
Trip Distance Share Rural	71.25945	% distance
Trip Distance Share Motorway	0.00000	% distance

BS CO2 DC	511.03869	g/hphr
BS CO DC	0.39561	g/hphr
BS THC DC	0.01760	g/hphr
BS NMHC DC	0.01697	g/hphr
BS CH4 DC	0.00018	g/hphr
BS NO DC (d)	0.01326	g/hphr
BS NO2 DC	0.00111	g/hphr
BS NOx DC	0.01412	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	623.37652	g/mi
DS CO DC	0.48257	g/mi
DS THC DC	0.02147	g/mi
DS NMHC DC	0.02071	g/mi
DS CH4 DC	0.00022	g/mi
DS NO DC (d)	0.01617	g/mi
DS NO2 DC	0.00135	g/mi
DS NOx DC	0.01722	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	2916.13664	g/kg
FS CO DC	2.25746	g/kg
FS THC DC	0.10045	g/kg
FS NMHC DC	0.09686	g/kg
FS CH4 DC	0.00104	g/kg
FS NO DC (d)	0.07564	g/kg
FS NO2 DC	0.00633	g/kg
FS NOx DC	0.08056	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: 504 Build 119, Serial Number: 1604
M.O.V.E Post-Processing: DT_1R4.1_B340
Legislation:

Vehicle: L447-2128 /
Engine: /
NOx Ambient Condition Corr.: 7 - CFR40 §1065.670
Dry / Wet Corr.: 2 - CFR40 §86.1342-90

Case: L447-2128
Page: Time Alignment Check

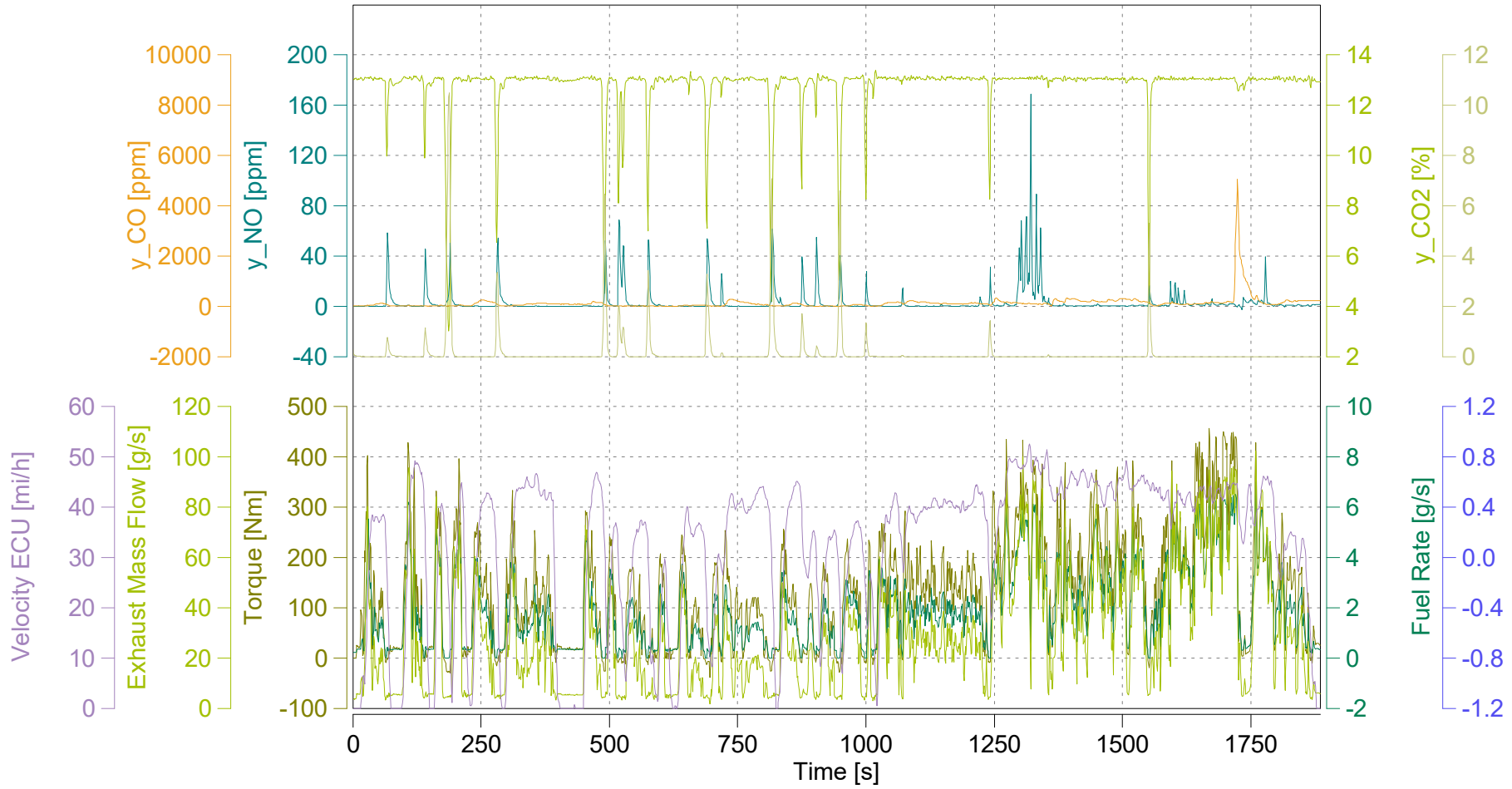
'A2 Mountain Uphill'
Start Date: 05/13/2021
Start Time: 09:07:53.0

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 Plo

Reset Time

Reset Al

Apply Curr

Concerto Version: 504 Build 119, Serial Number: 1604
M.O.V.E Post-Processing: DT_1R4.1_B340
Legislation:

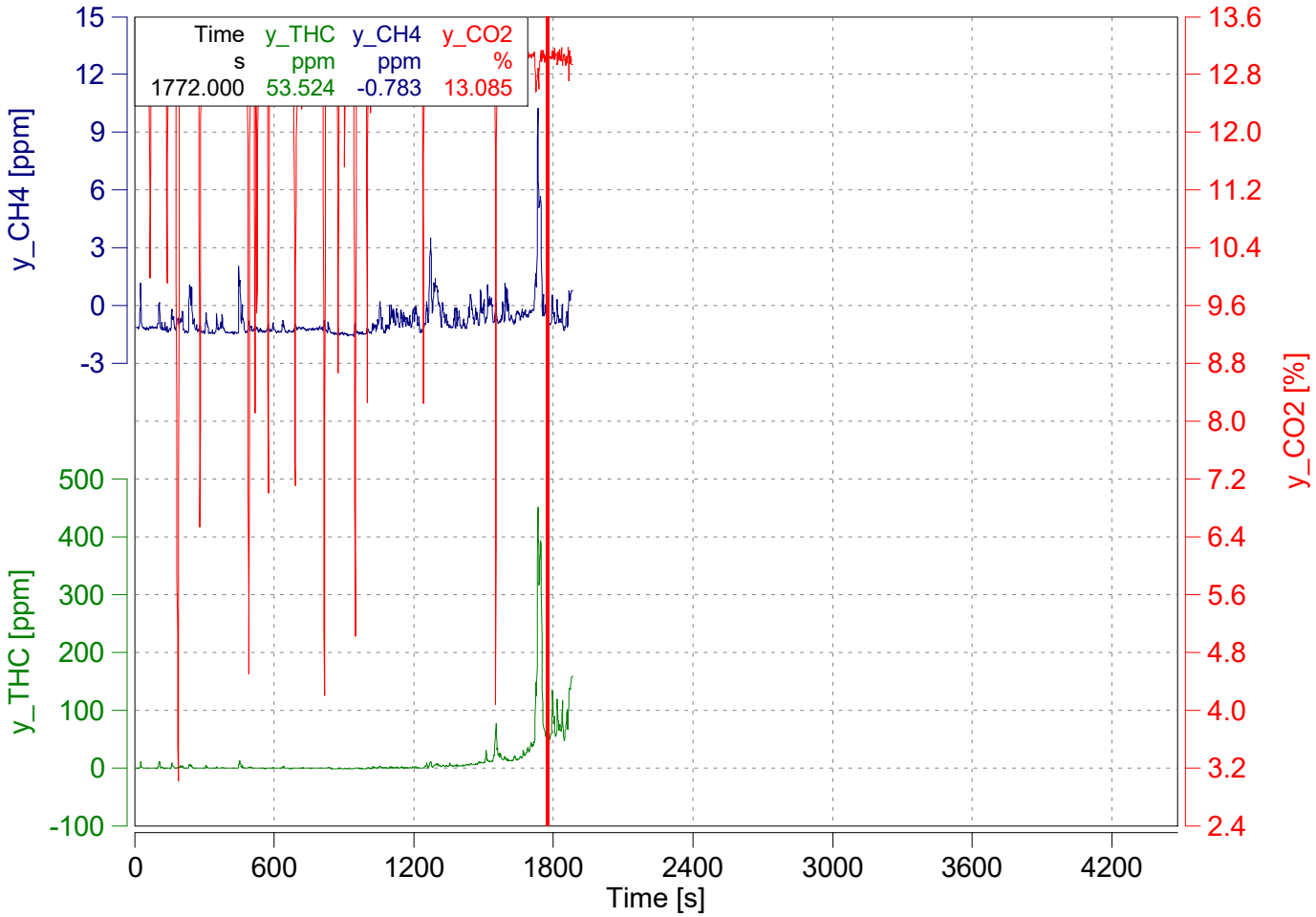
Vehicle: L447-2128 /
Engine: /
NOx Ambient Condition Corr.: 7 - CFR40 §1065.670
Dry / Wet Corr.: 2 - CFR40 §86.1342-90

Case: L447-2128
Page: Time Alignment of Gas Concentrations

'A2 Mountain Uphill'
Start Date: 05/13/2021
Start Time: 09:07:53.0

AVL

Concerto M.O.V.E, 2019



Absolute Time Shifts

y_THC	s	-5.2
y_CH4	s	-7.2

Reset Time Shifts in Plot

Apply Current Values

Concerto Version: 504 Build 119, Serial Number: 1604
M.O.V.E Post-Processing: DT_1R4.1_B340
Legislation:

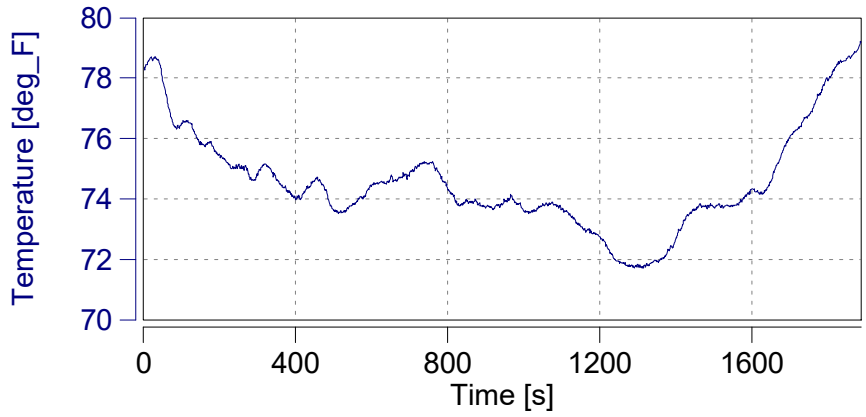
Vehicle: L447-2128 /
Engine: /
NOx Ambient Condition Corr.: 7 - CFR40 §1065.670
Dry / Wet Corr.: 2 - CFR40 §86.1342-90

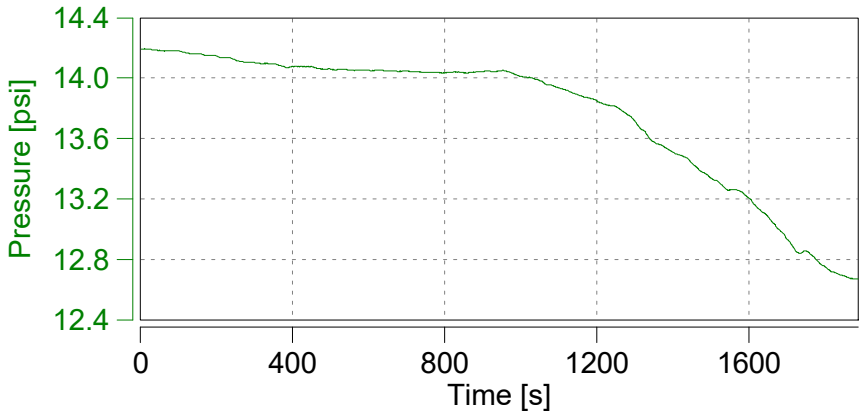
Case: L447-2128
Page: Ambient Conditions

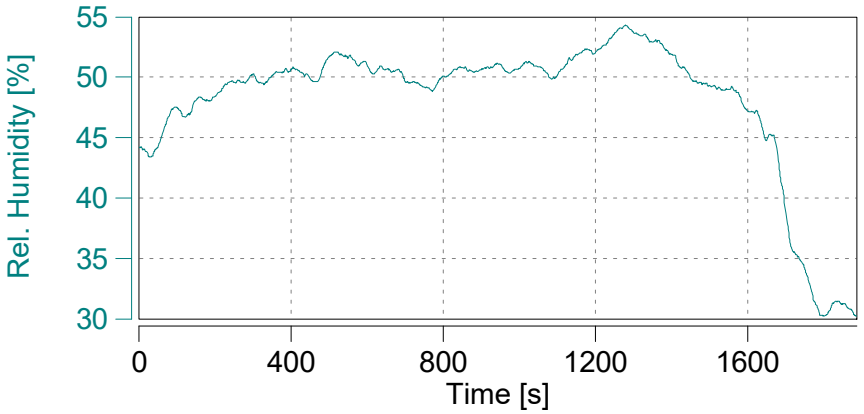
'A2 Mountain Uphill'
Start Date: 05/13/2021
Start Time: 09:07:53.0

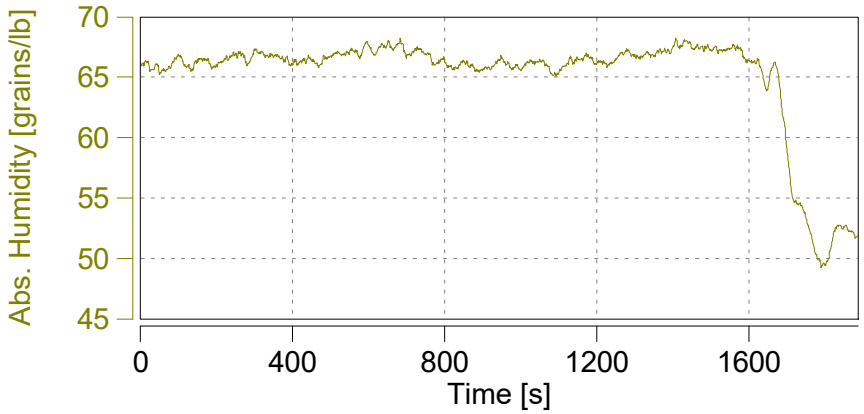
AVL

Concerto M.O.V.E, 2019









Concerto Version: 504 Build 119, Serial Number: 1604
M.O.V.E Post-Processing: DT_1R4.1_B340
Legislation:

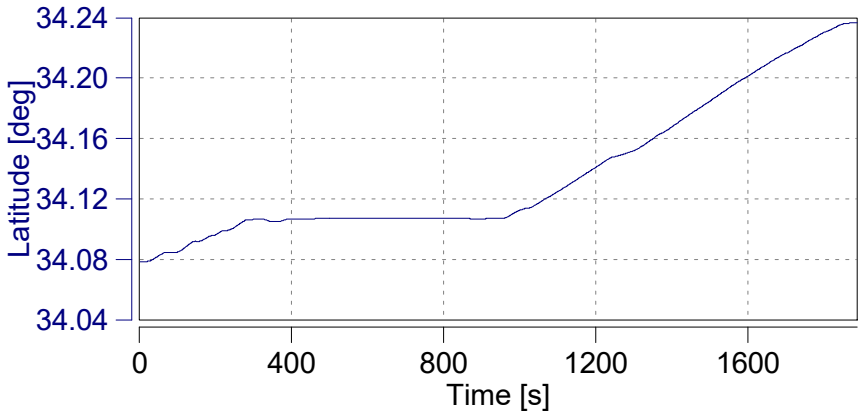
Vehicle: L447-2128 /
Engine: /
NOx Ambient Condition Corr.: 7 - CFR40 §1065.670
Dry / Wet Corr.: 2 - CFR40 §86.1342-90

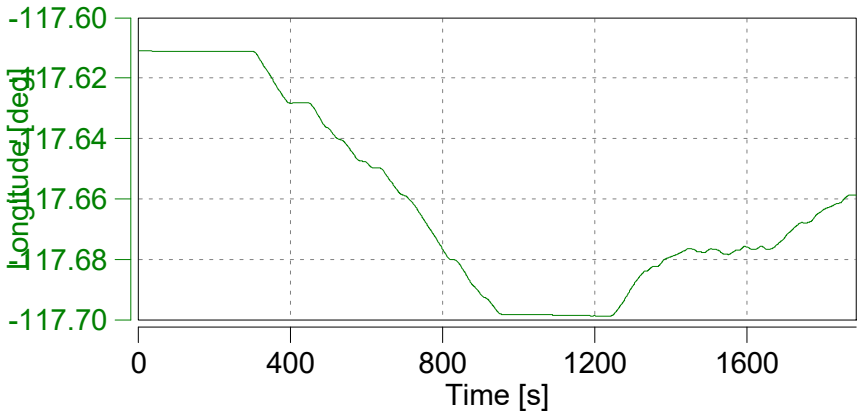
Case: L447-2128
Page: GPS

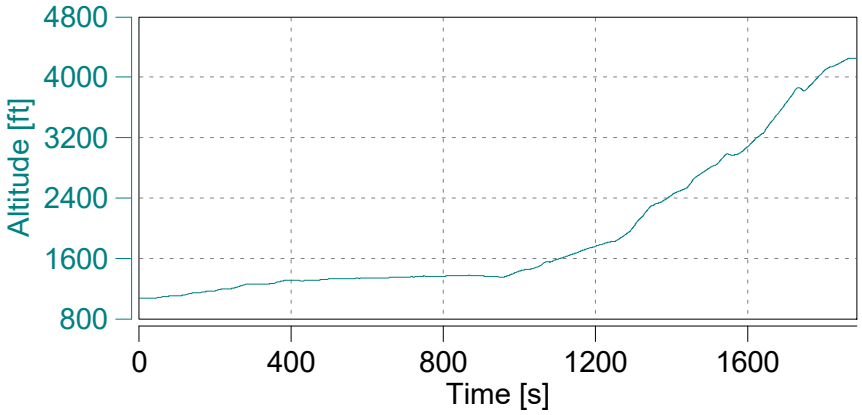
'A2 Mountain Uphill'
Start Date: 05/13/2021
Start Time: 09:07:53.0

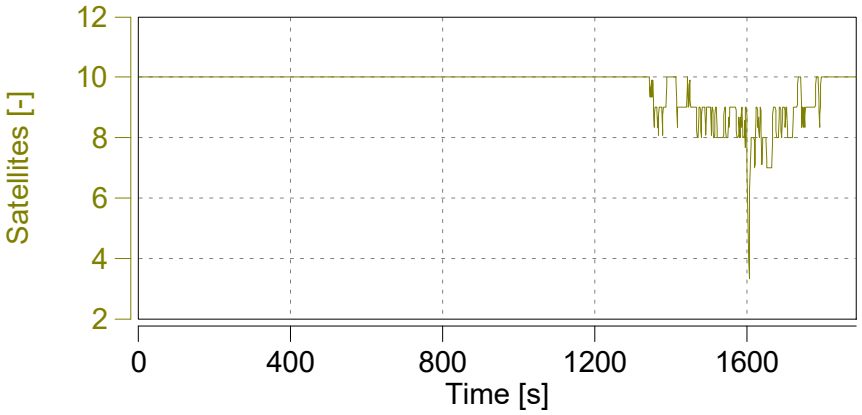
AVL

Concerto M.O.V.E, 2019









Concerto Version: 504 Build 119, Serial Number: 1604
M.O.V.E Post-Processing: DT_1R4.1_B340
Legislation:

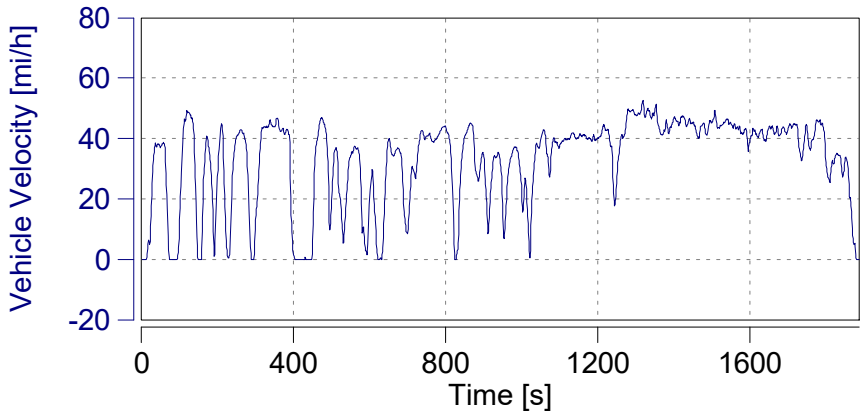
Vehicle: L447-2128 /
Engine: /
NOx Ambient Condition Corr.: 7 - CFR40 §1065.670
Dry / Wet Corr.: 2 - CFR40 §86.1342-90

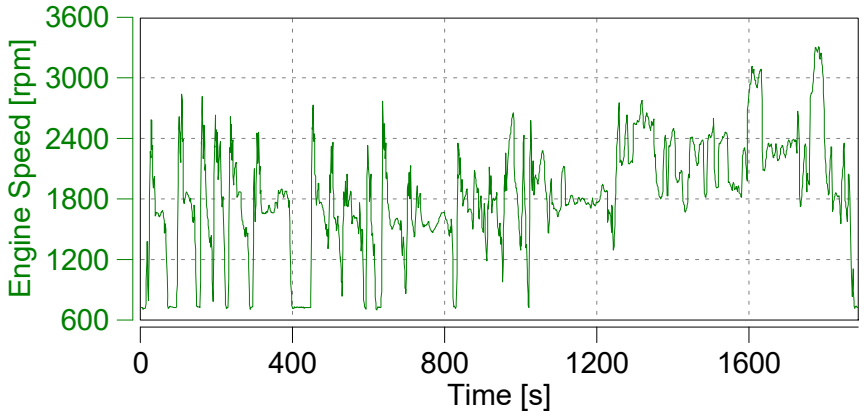
Case: L447-2128
Page: Engine (1)

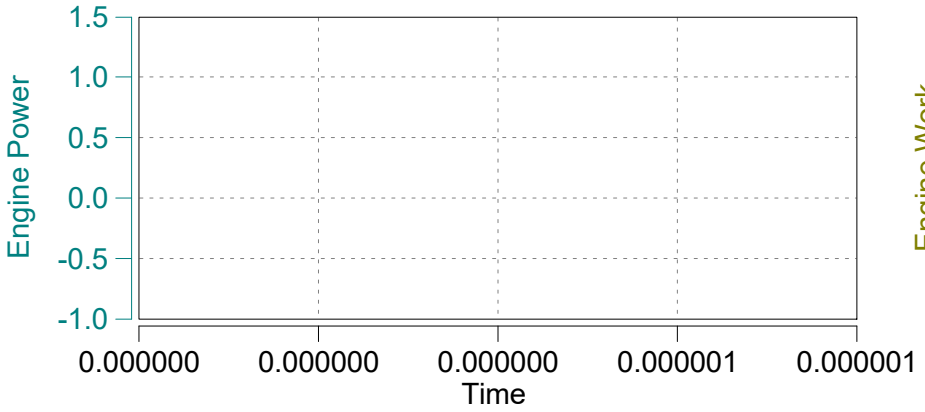
'A2 Mountain Uphill'
Start Date: 05/13/2021
Start Time: 09:07:53.0

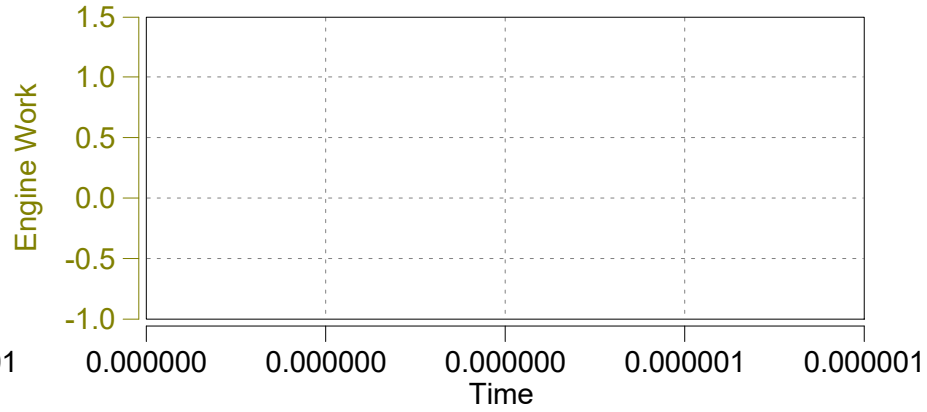
AVL

Concerto M.O.V.E, 2019









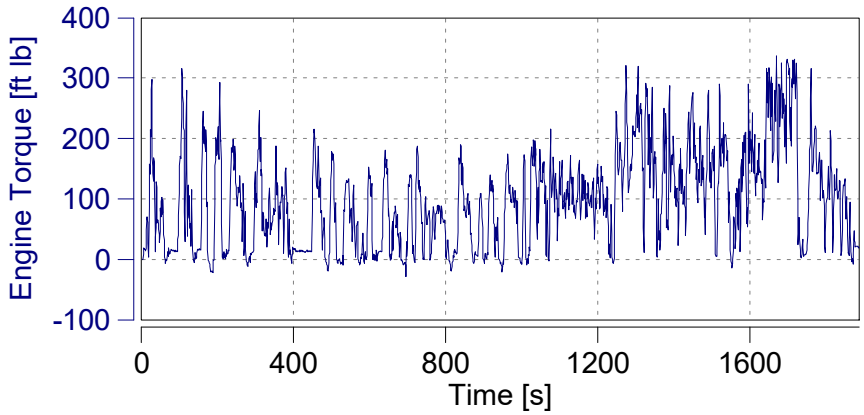
Concerto Version: 504 Build 119, Serial Number: 1604
M.O.V.E Post-Processing: DT_1R4.1_B340
Legislation:

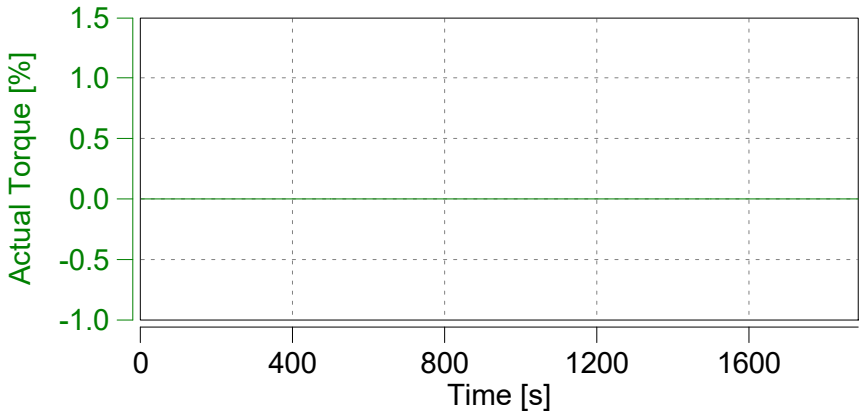
Vehicle: L447-2128 /
Engine: /
NOx Ambient Condition Corr.: 7 - CFR40 §1065.670
Dry / Wet Corr.: 2 - CFR40 §86.1342-90

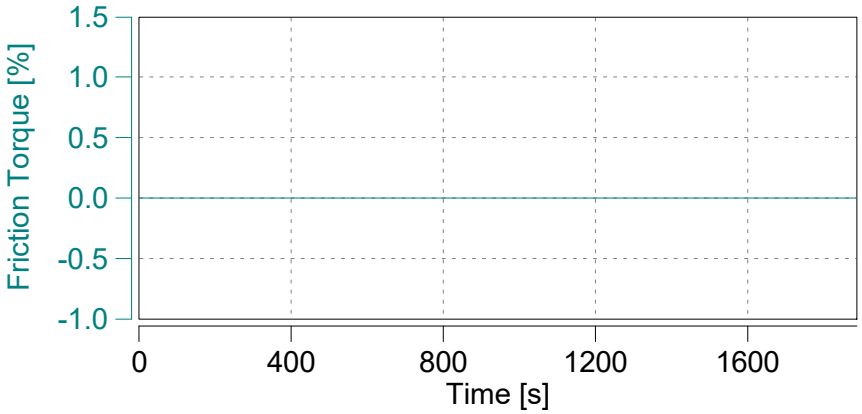
'A2 Mountain Uphill'
Start Date: 05/13/2021
Start Time: 09:07:53.0

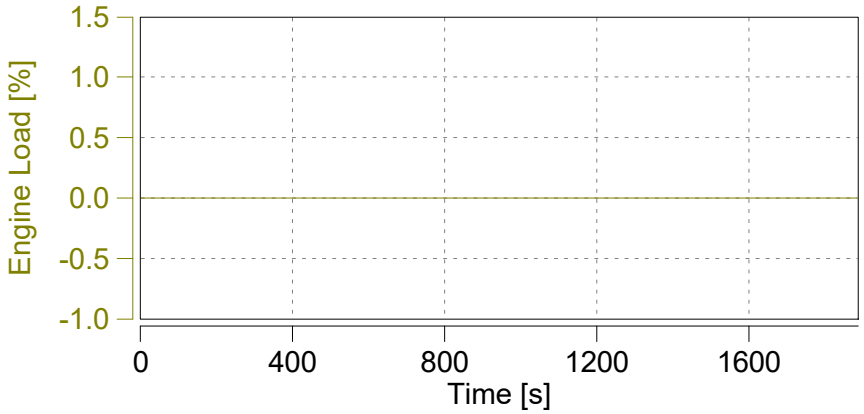
AVL

Concerto M.O.V.E, 2019









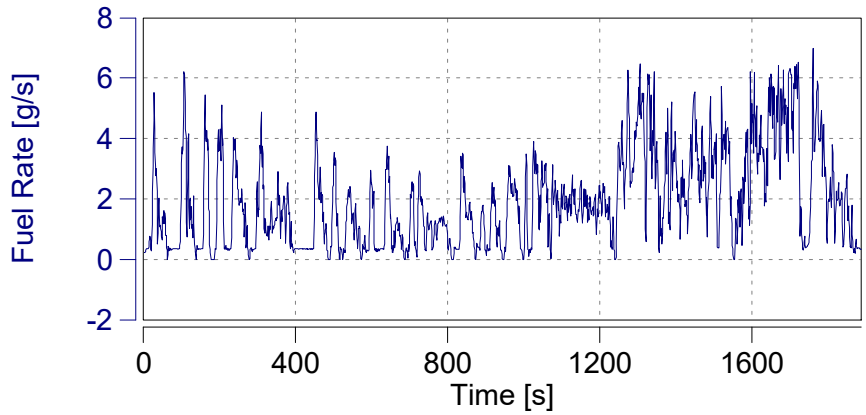
Concerto Version: 504 Build 119, Serial Number: 1604
M.O.V.E Post-Processing: DT_1R4.1_B340
Legislation:

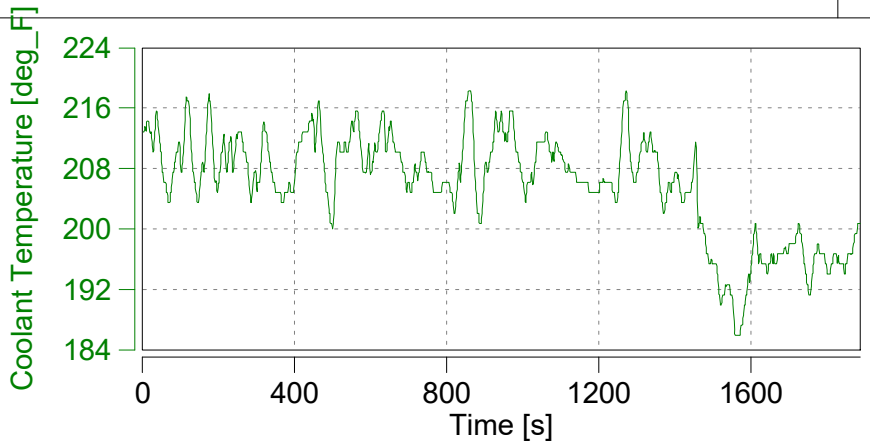
Vehicle: L447-2128 /
Engine: /
NOx Ambient Condition Corr.: 7 - CFR40 §1065.670
Dry / Wet Corr.: 2 - CFR40 §86.1342-90

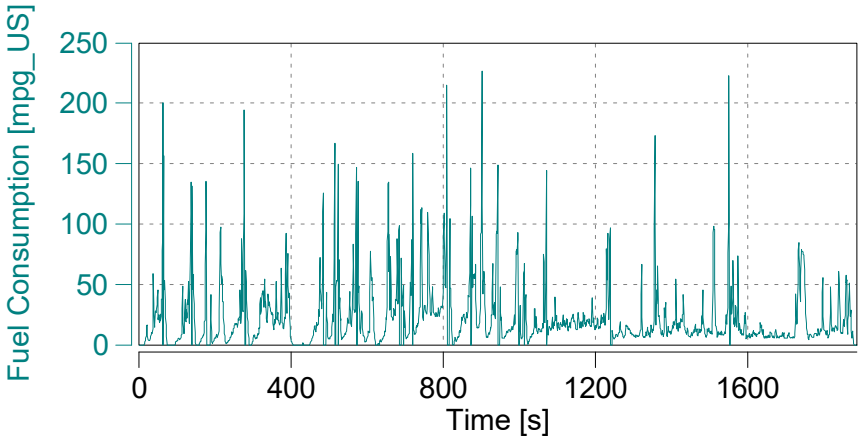
'A2 Mountain Uphill'
Start Date: 05/13/2021
Start Time: 09:07:53.0

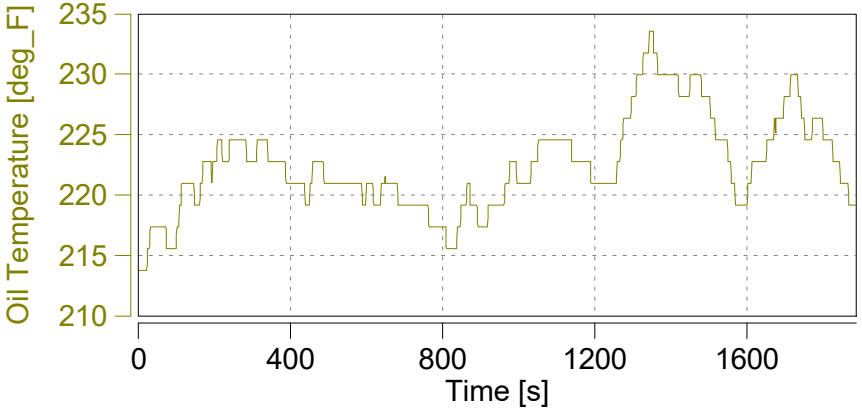
AVL

Concerto M.O.V.E, 2019









Concerto Version: 504 Build 119, Serial Number: 1604
M.O.V.E Post-Processing: DT_1R4.1_B340
Legislation:

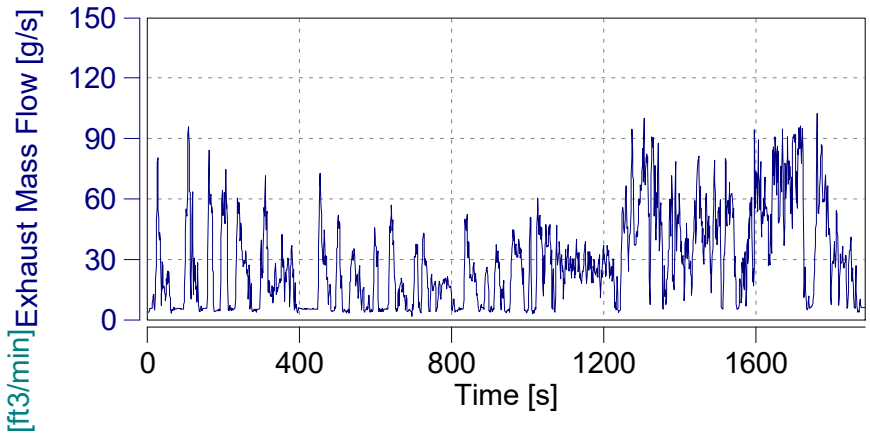
Vehicle: L447-2128 /
Engine: /
NOx Ambient Condition Corr.: 7 - CFR40 §1065.670
Dry / Wet Corr.: 2 - CFR40 §86.1342-90

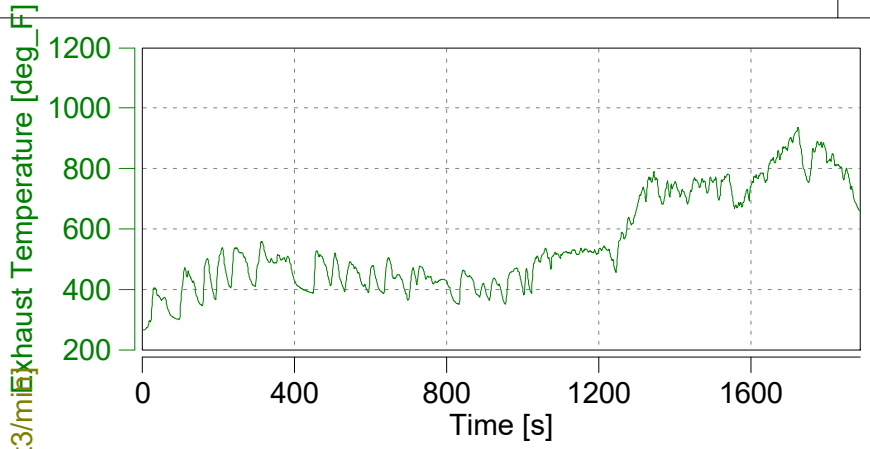
Case: L447-2128
Page: Exhaust Flow (1)

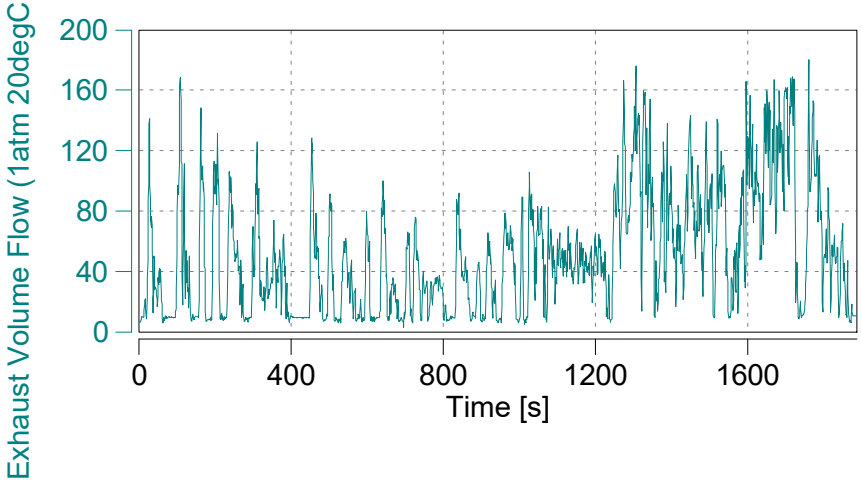
'A2 Mountain Uphill'
Start Date: 05/13/2021
Start Time: 09:07:53.0

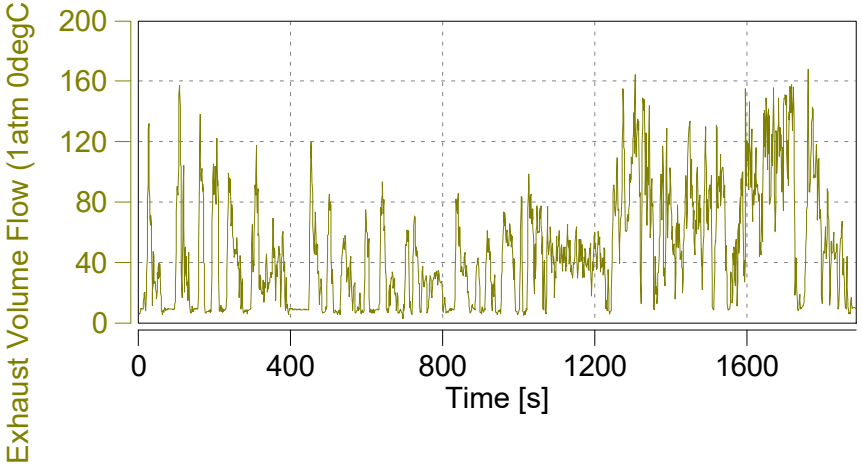
AVL

Concerto M.O.V.E, 2019









Concerto Version: 504 Build 119, Serial Number: 1604
M.O.V.E Post-Processing: DT_1R4.1_B340
Legislation:

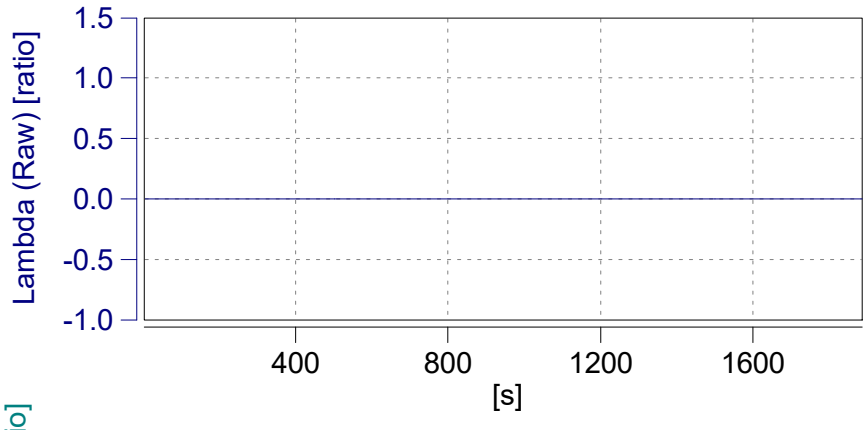
Vehicle: L447-2128 /
Engine: /
NOx Ambient Condition Corr.: 7 - CFR40 §1065.670
Dry / Wet Corr.: 2 - CFR40 §86.1342-90

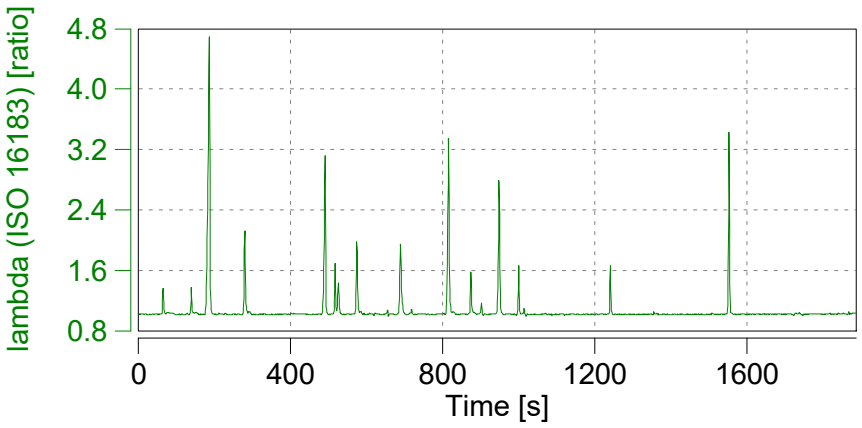
Case: L447-2128
Page: Exhaust Flow (2)

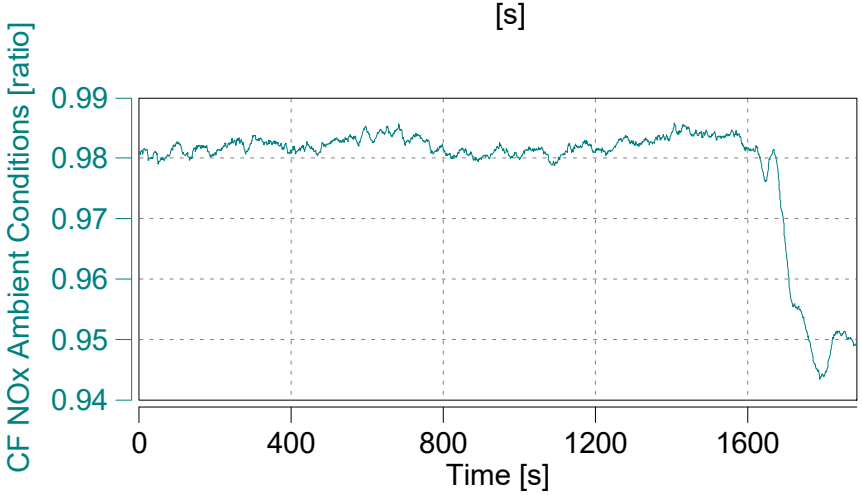
'A2 Mountain Uphill'
Start Date: 05/13/2021
Start Time: 09:07:53.0

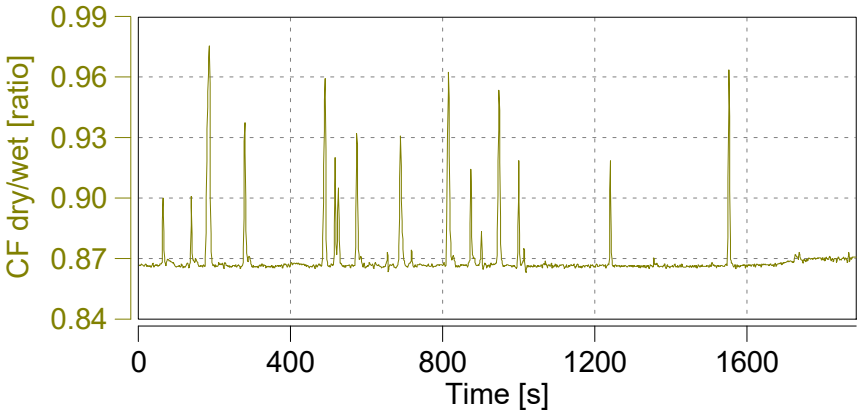
AVL

Concerto M.O.V.E, 2019









Concerto Version: 504 Build 119, Serial Number: 1604
M.O.V.E Post-Processing: DT_1R4.1_B340
Legislation:

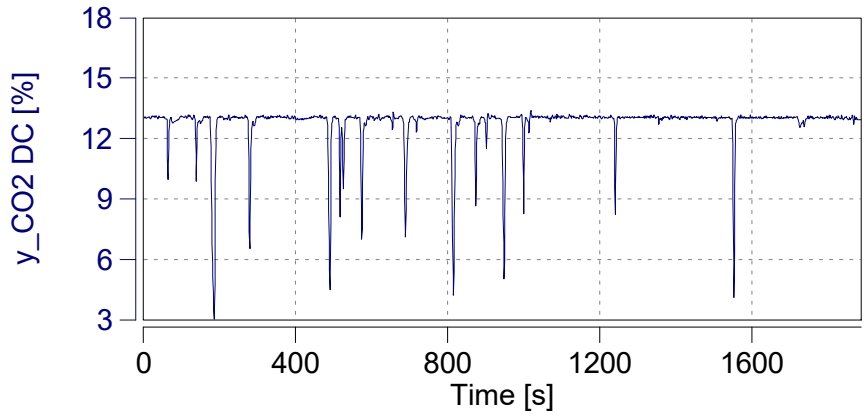
Vehicle: L447-2128 /
Engine: /
NOx Ambient Condition Corr.: 7 - CFR40 §1065.670
Dry / Wet Corr.: 2 - CFR40 §86.1342-90

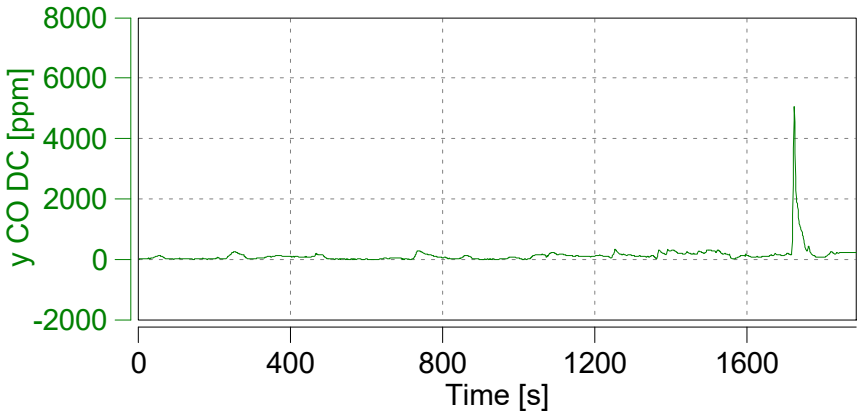
Case: L447-2128
Page: Corrected Emissions (1)

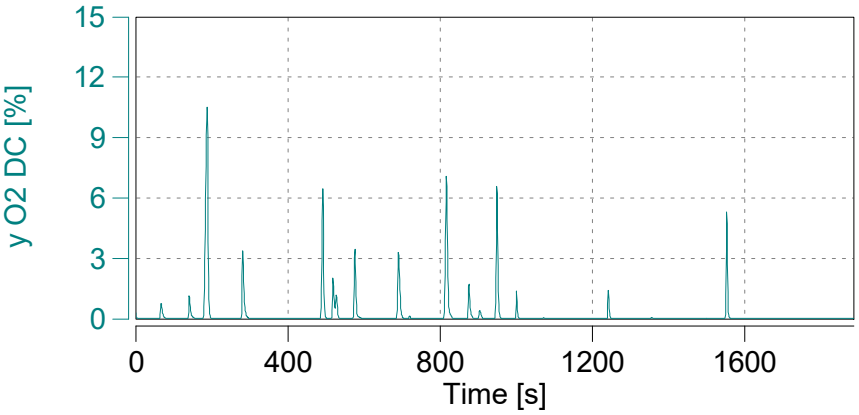
'A2 Mountain Uphill'
Start Date: 05/13/2021
Start Time: 09:07:53.0

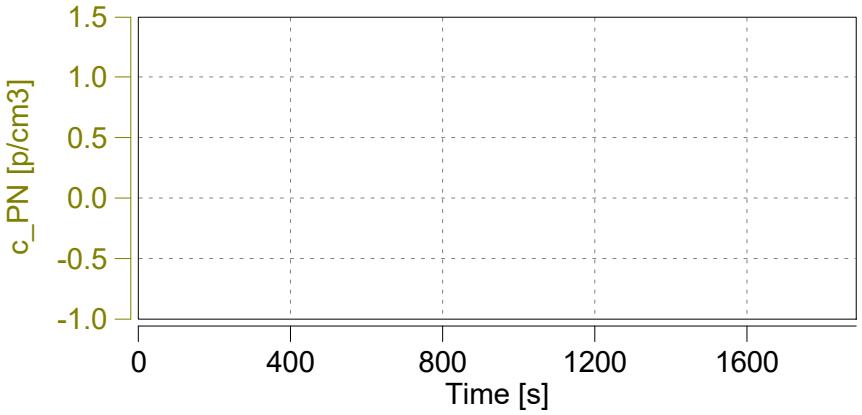
AVL

Concerto M.O.V.E, 2019









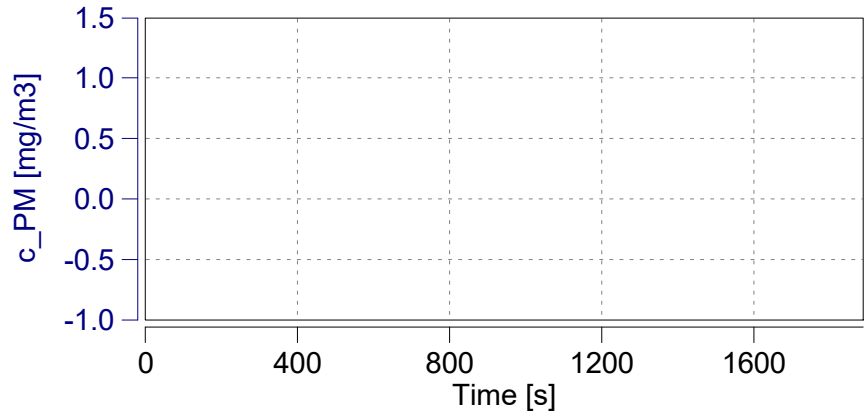
Concerto Version: 504 Build 119, Serial Number: 1604
M.O.V.E Post-Processing: DT_1R4.1_B340
Legislation:

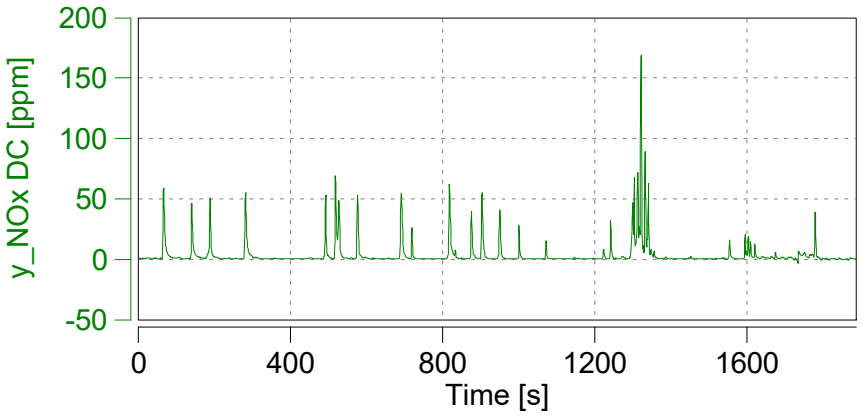
Vehicle: L447-2128 /
Engine: /
NOx Ambient Condition Corr.: 7 - CFR40 §1065.670
Dry / Wet Corr.: 2 - CFR40 §86.1342-90

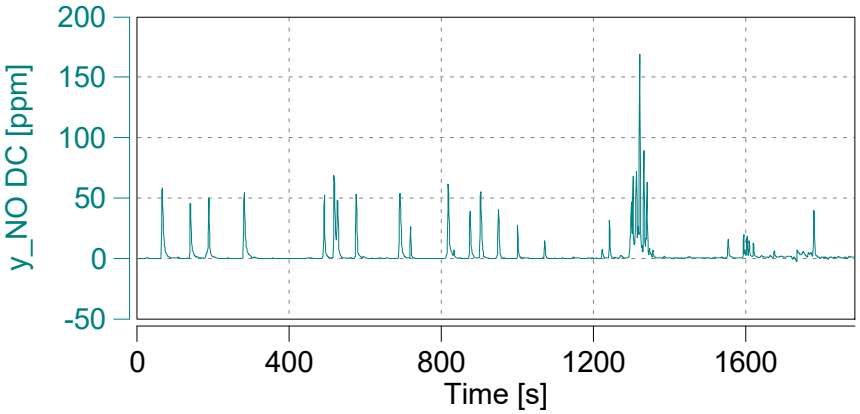
'A2 Mountain Uphill'
Start Date: 05/13/2021
Start Time: 09:07:53.0

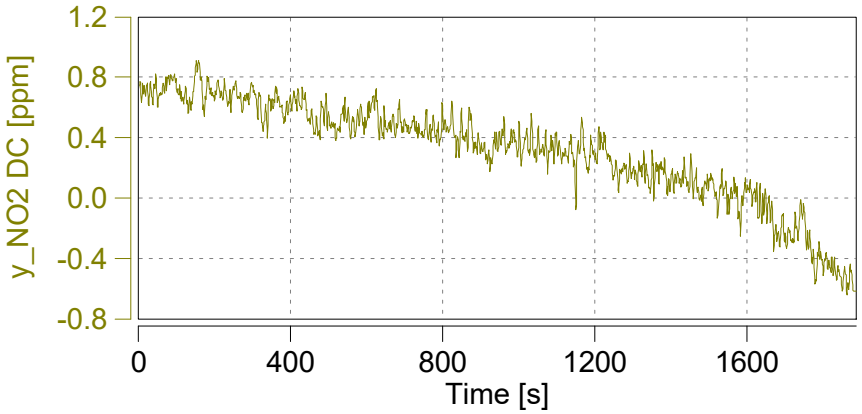
AVL

Concerto M.O.V.E, 2019









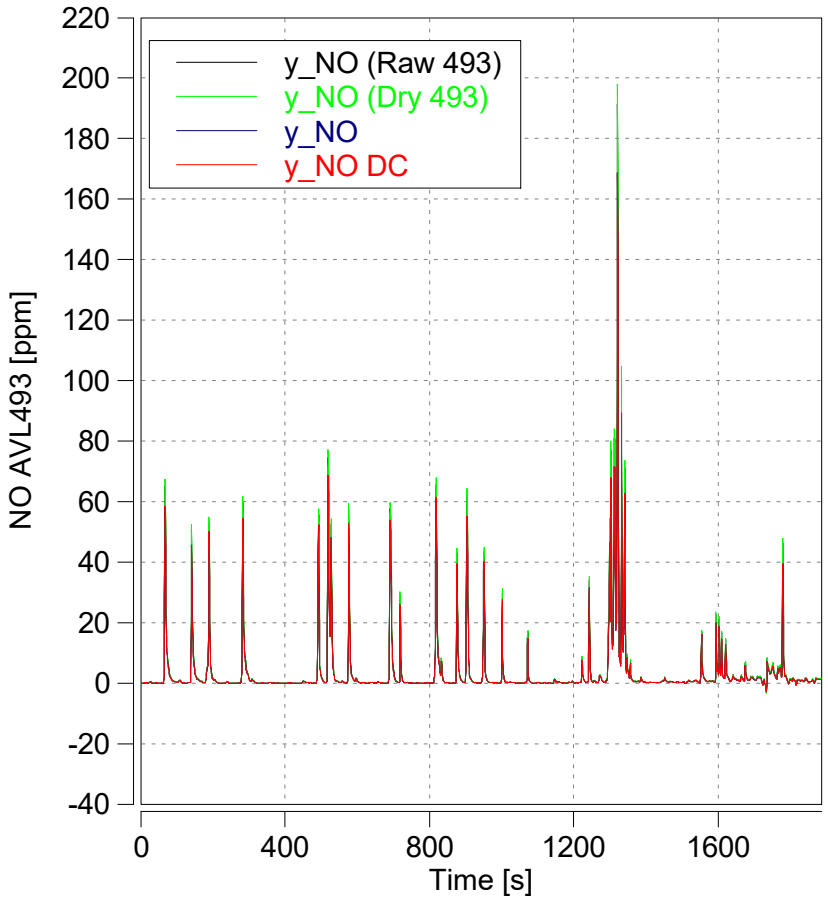
Concerto Version: 504 Build 119, Serial Number: 1604
M.O.V.E Post-Processing: DT_1R4.1_B340
Legislation:

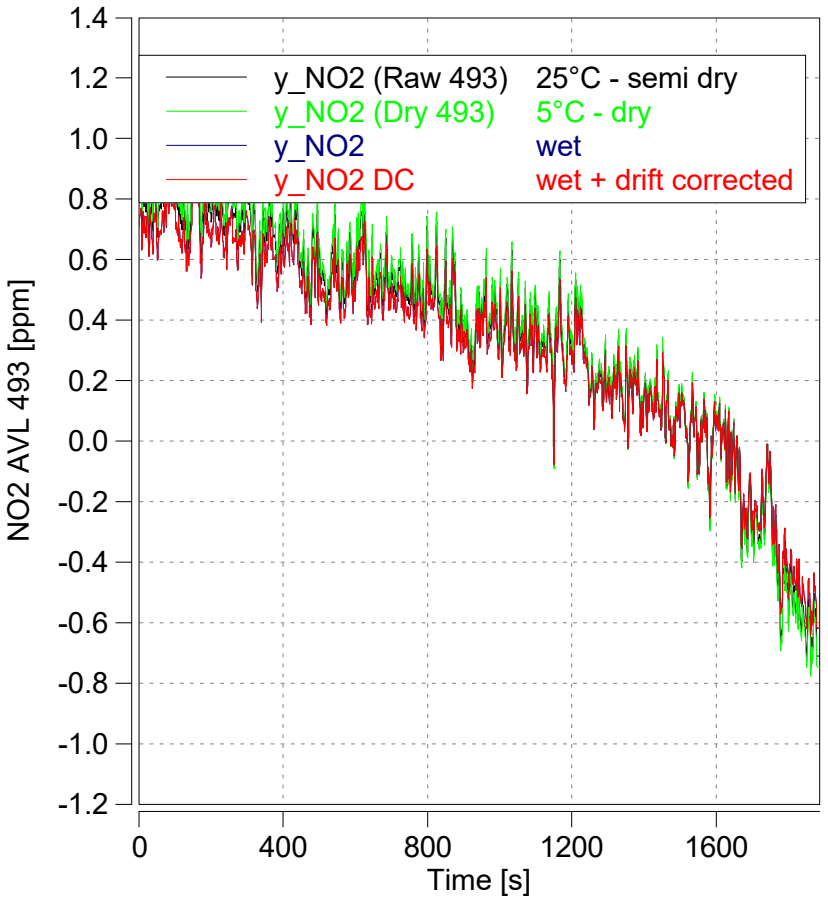
Vehicle: L447-2128 /
Engine: /
NOx Ambient Condition Corr.: 7 - CFR40 §1065.670
Dry / Wet Corr.: 2 - CFR40 §86.1342-90

Case: L447-2128
Page: Corrected Emissions (3)

'A2 Mountain Uphill'
Start Date: 05/13/2021
Start Time: 09:07:53.0

AVL
Concerto M.O.V.E, 2019

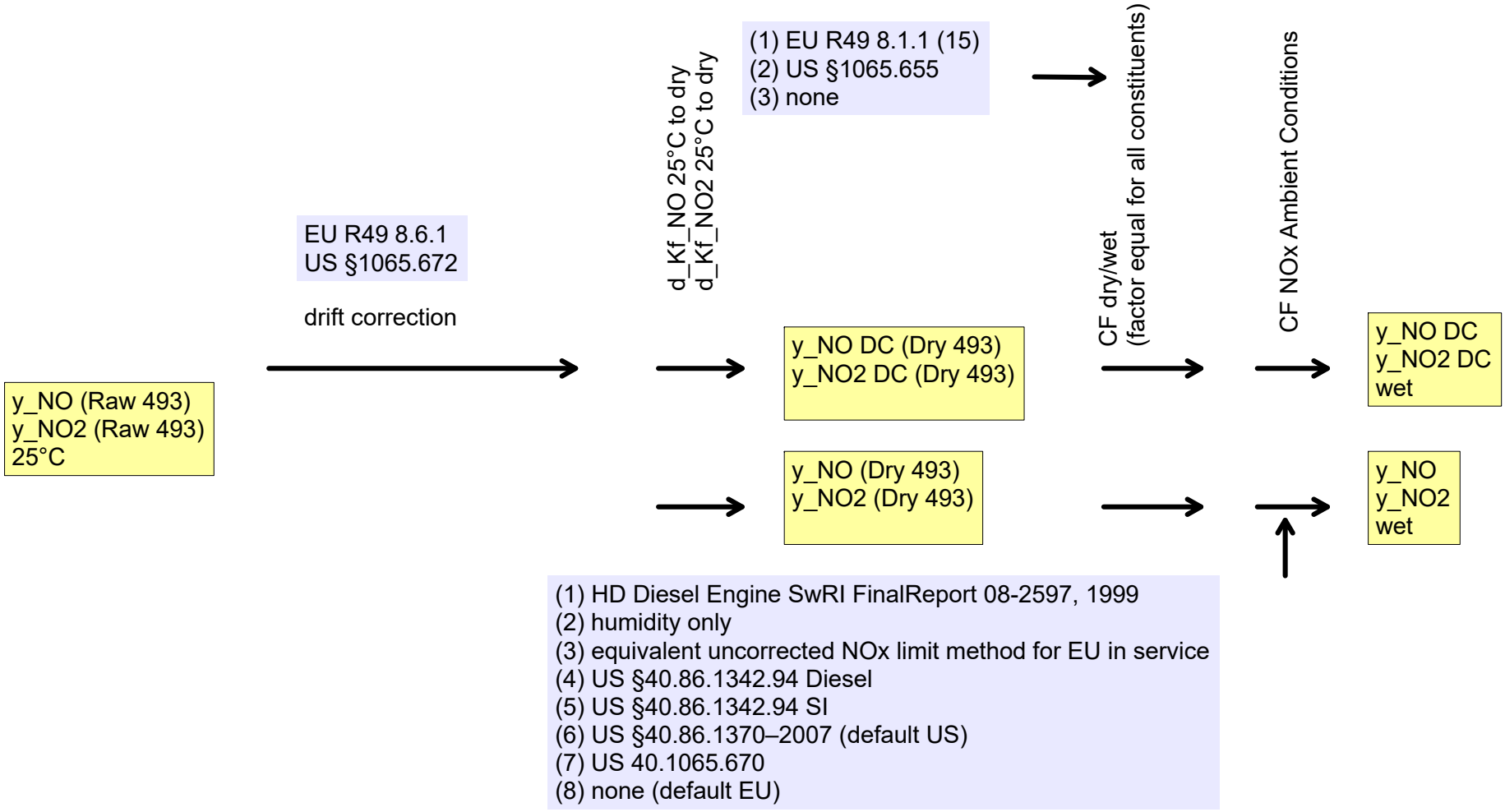




Concerto Version: 504 Build 119, Serial Number: 1604
M.O.V.E Post-Processing: DT_1R4.1_B340
Legislation:

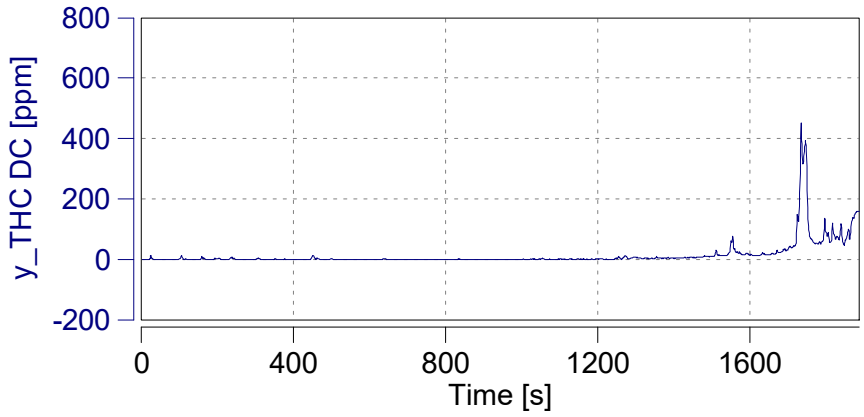
Vehicle: L447-2128 /
Engine: /
NOx Ambient Condition Corr.: 7 - CFR40 §1065.670
Dry / Wet Corr.: 2 - CFR40 §86.1342-90

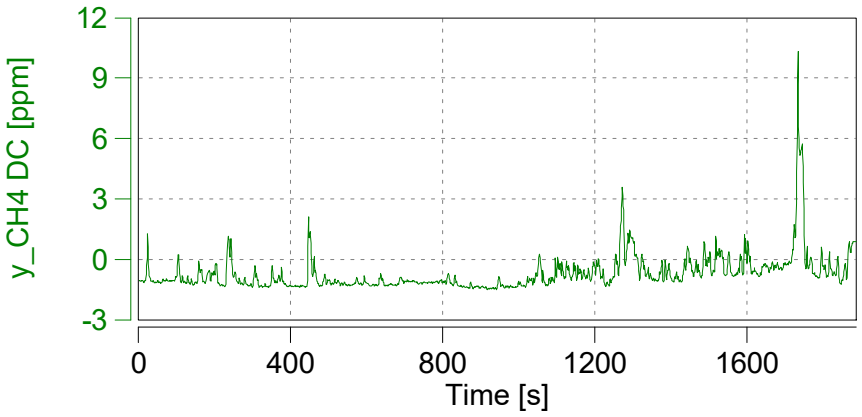
NOx - AVL 493

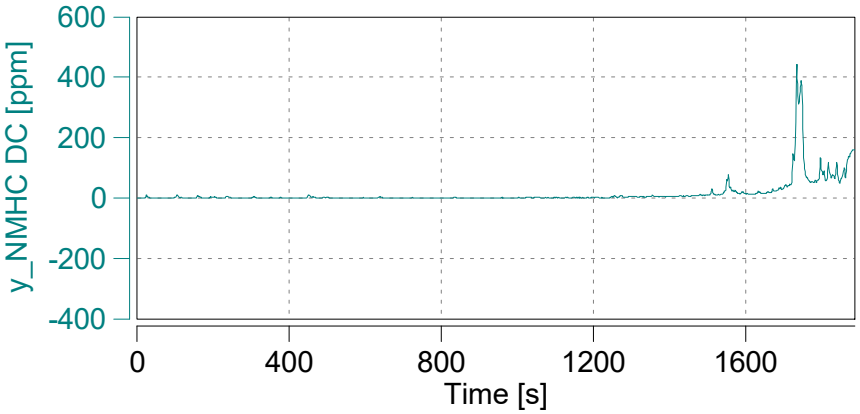

y_NO (Raw 493)
y_NO2 (Raw 493)
25°C
EU R49 8.6.1
US §1065.672
drift correction
d_Kf_NO 25°C to dry
d_Kf_NO2 25°C to dry
(1) EU R49 8.1.1 (15)
(2) US §1065.655
(3) none
y_NO DC (Dry 493)
y_NO2 DC (Dry 493)
y_NO (Dry 493)
y_NO2 (Dry 493)
CF dry/wet
(factor equal for all constituents)
CF NOx Ambient Conditions
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)

'A2 Mountain Uphill'
Start Date: 05/13/2021
Start Time: 09:07:53.0

AVL
Concerto M.O.V.E, 2019







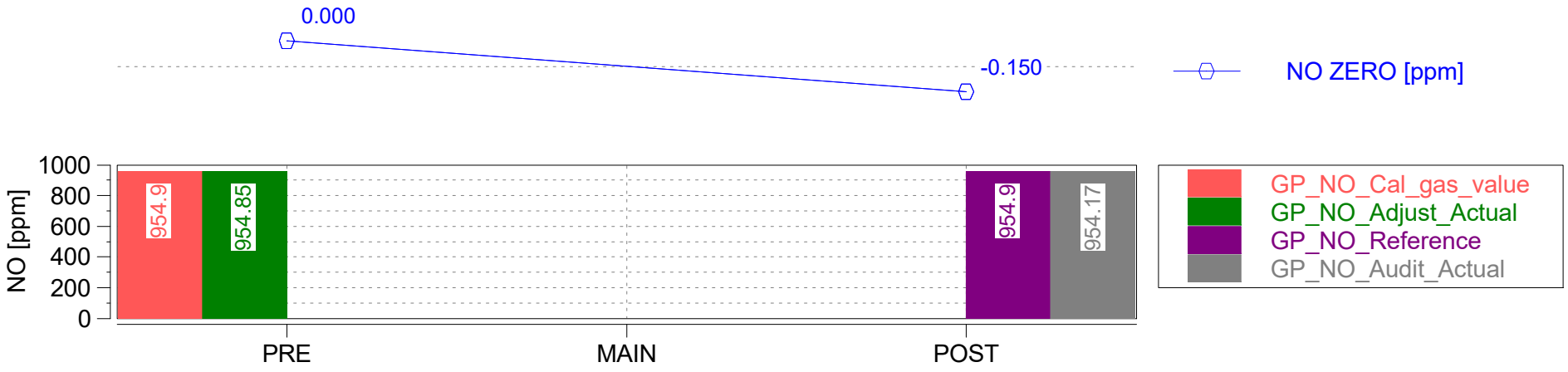
Concerto Version: 504 Build 119, Serial Number: 1604
M.O.V.E Post-Processing: DT_1R4.1_B340
Legislation:

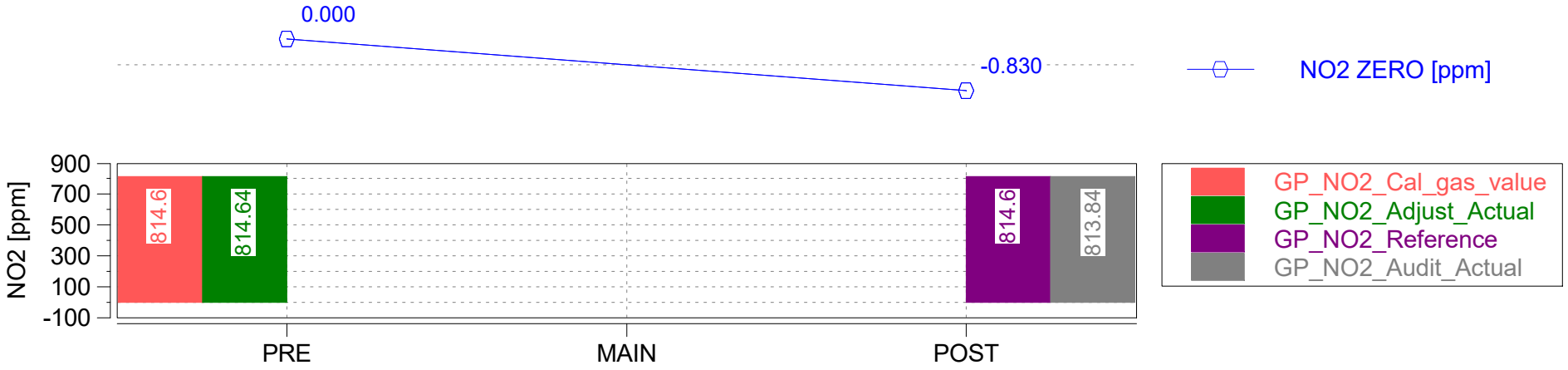
Vehicle: L447-2128 /
Engine: /
NOx Ambient Condition Corr.: 7 - CFR40 §1065.670
Dry / Wet Corr.: 2 - CFR40 §86.1342-90

Case: L447-2128
Page: NO/NO2/NOx Zero - Span

'A2 Mountain Uphill'
Start Date: 05/13/2021
Start Time: 09:07:53.0

AVL
Concerto M.O.V.E, 2019





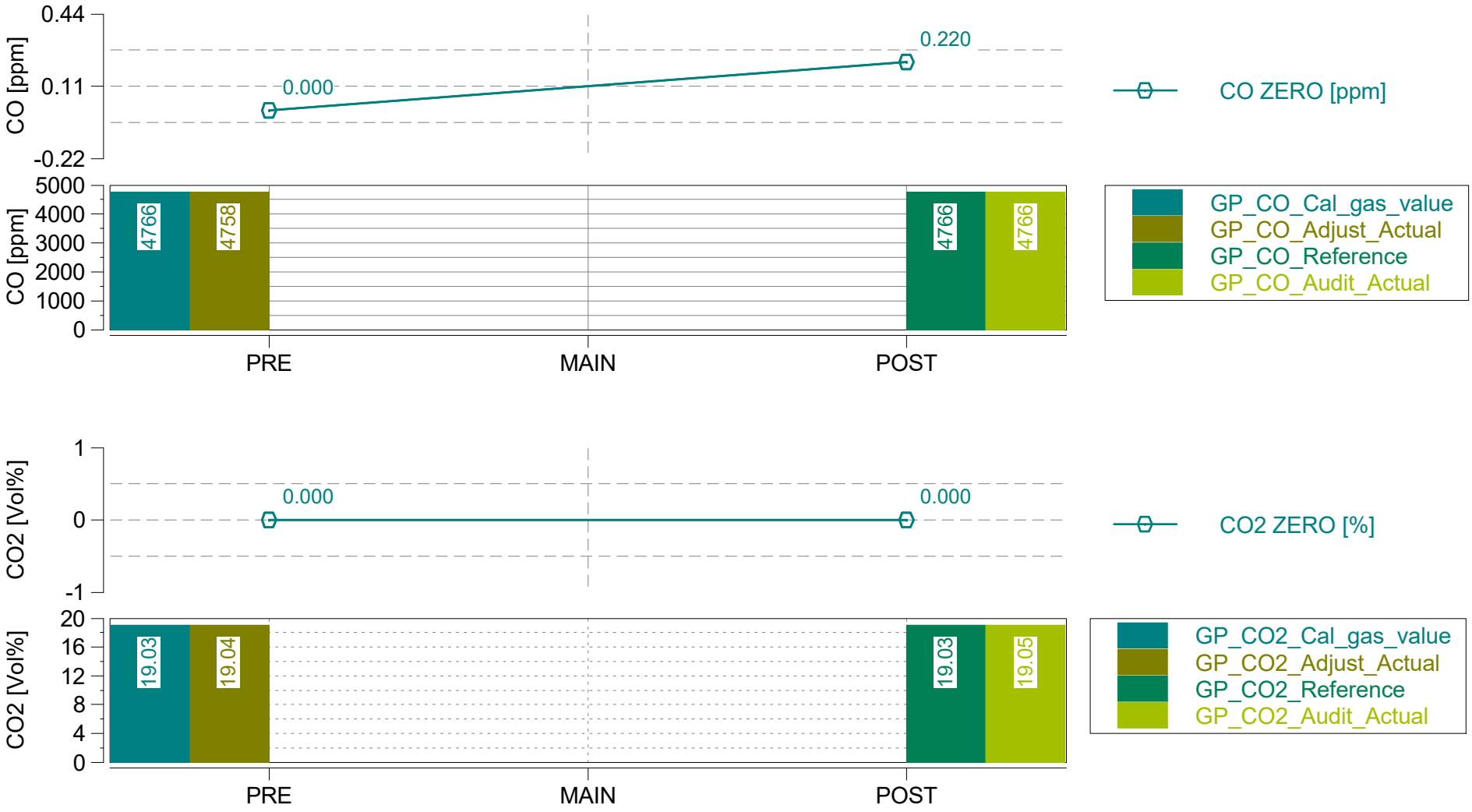
Concerto Version: 504 Build 119, Serial Number: 1604
M.O.V.E Post-Processing: DT_1R4.1_B340
Legislation:

Vehicle: L447-2128 /
Engine: /
NOx Ambient Condition Corr.: 7 - CFR40 §1065.670
Dry / Wet Corr.: 2 - CFR40 §86.1342-90

Case: L447-2128
Page: CO/CO2 Zero - Span

'A2 Mountain Uphill'
Start Date: 05/13/2021
Start Time: 09:07:53.0

AVL
Concerto M.O.V.E, 2019



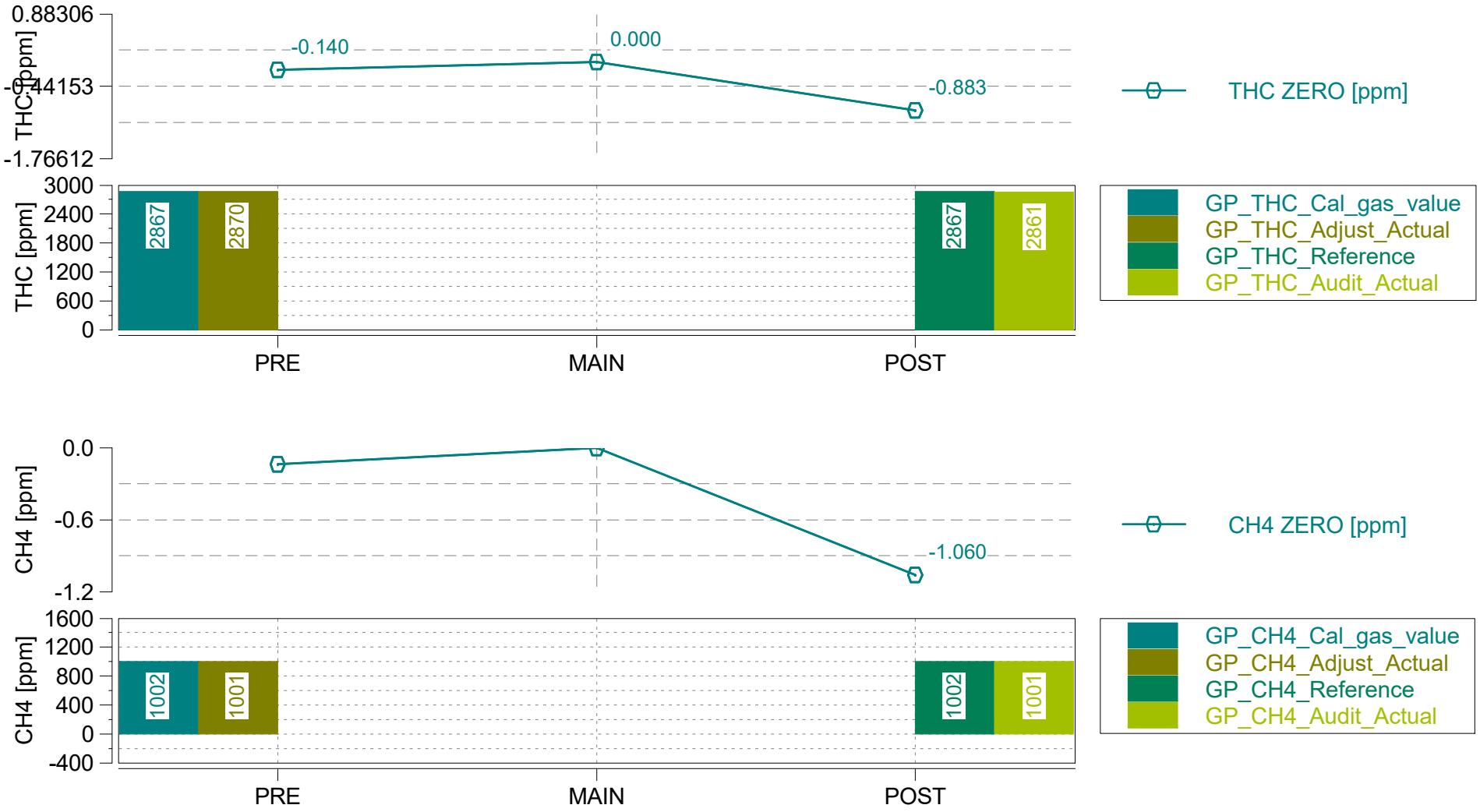
Concerto Version: 504 Build 119, Serial Number: 1604
M.O.V.E Post-Processing: DT_1R4.1_B340
Legislation:

Vehicle: L447-2128 /
Engine: /
NOx Ambient Condition Corr.: 7 - CFR40 §1065.670
Dry / Wet Corr.: 2 - CFR40 §86.1342-90

Case: L447-2128
Page: THC/CH4 Zero - Span

'A2 Mountain Uphill'
Start Date: 05/13/2021
Start Time: 09:07:53.0

AVL
Concerto M.O.V.E, 2019



Concerto Version: 504 Build 119, Serial Number: 1604
M.O.V.E Post-Processing: DT_1R4.1_B340
Legislation:

Vehicle: L447-2128 /
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%	**0.07**	**%**	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	0597
Firmware Version	V1.16
Main Test Date	2021-05-13
Leak Check Age [days]	0

Device ID	AVL4925
Serial Number	175
Firmware Version	1.20.0.8

EFM

Device ID	AVL495
Serial Number	00915
Serial Number Tube	01115
Firmware Version	V1.13

System Control

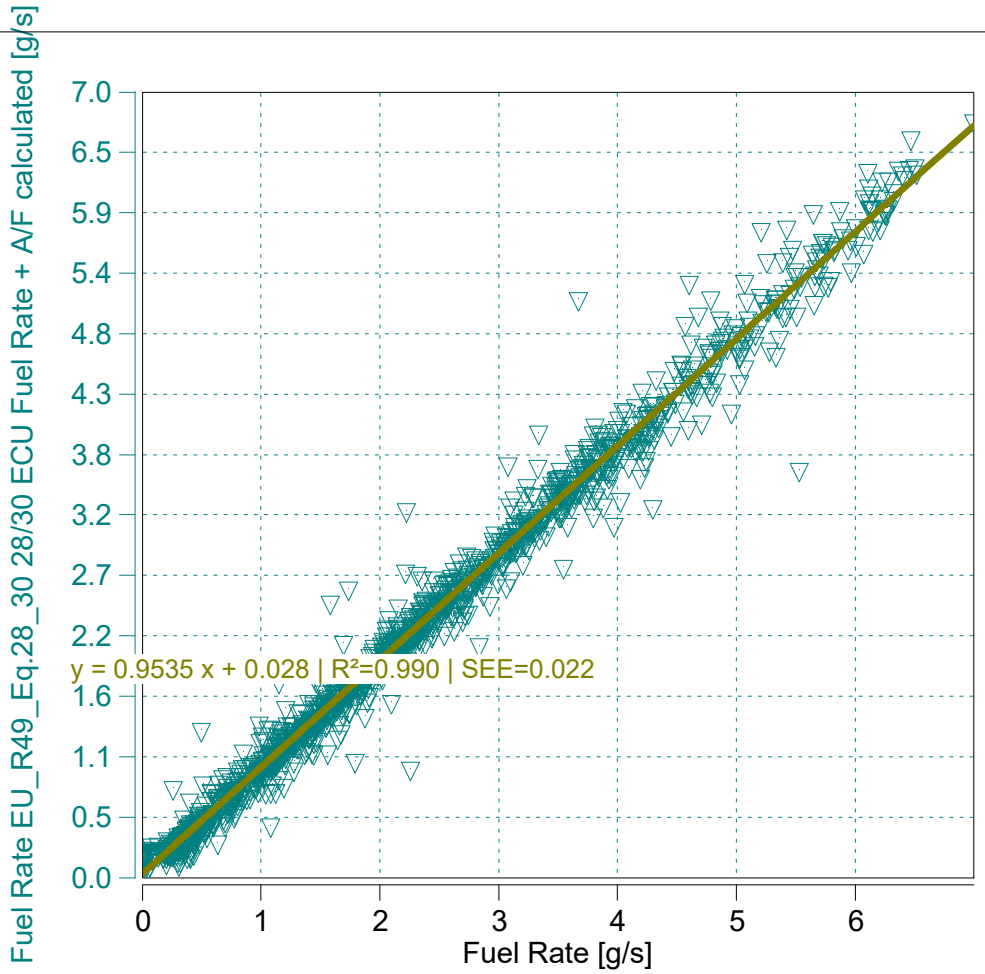
SC Version	V2.6_212
SC Serial Number	60300923

Case: L447-2128
Page: Fuel Rate ECU vs. Calculated

'A2 Mountain Uphill'
Start Date: 05/13/2021
Start Time: 09:07:53.0

AVL

Concerto M.O.V.E, 2019



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

y = 0.9535 x + 0.028 | R²=0.990 | SEE=0.022
m = 0.95 (0.9 - 1.1 recommended)
R² = 0.99 (min 0.9 mandatory)

Data from - to [% of Maximum]

0 100

Concerto Version: 504 Build 119, Serial Number: 1604
M.O.V.E Post-Processing: DT_1R4.1_B340
Legislation:

Vehicle: L447-2128 /
Engine: /
NOx Ambient Condition Corr.: 7 - CFR40 §1065.670
Dry / Wet Corr.: 2 - CFR40 §86.1342-90

Case: L447-2128
Page: Trip Summary

'B1 Mountain Downhill'
Start Date: 05/13/2021
Start Time: 09:07:53.0

AVL
Concerto M.O.V.E, 2019

Trip Duration	1862.00	s
Trip Duration (a)	1862.00	s
Trip Distance	18.12	mi
Trip Distance (a)	18.12	mi
Trip Fuel Cons. (b)	1.44	kg
Trip Fuel Cons. (ab)	1.44	kg
Trip Fuel Cons. EU (ac)	1.43	kg
Trip Fuel Cons. US (ac)	1.42	kg
Trip Fuel Economy (b)	35.67	mpg_US
Trip Fuel Economy (ab)	35.67	mpg_US
Trip Fuel Economy EU (ac)	35.75	mpg_US
Trip Fuel Economy US (ac)	36.05	mpg_US
Trip Fuel Economy GGE (b)	35.67	mpg_US
Trip Fuel Economy GGE (ab)	35.67	mpg_US
Trip Fuel Economy EU GGE (ac)	35.75	mpg_US
Trip Fuel Economy US GGE (ac)	36.05	mpg_US
Trip Av. Eng. Speed	1738.94	rpm
Trip Av. Torque	34.00	lbft
Trip Av. Power	12.44	hp
Trip Work		
Trip Work (a)	6.44	hphr
Trip Exhaust Mass	24.44	kg
Trip Exhaust Mass EU (ac)	22.56	kg
Trip Exhaust Mass US (ac)	22.80	kg
Trip Av. Amb. Temperature	76.55	deg_F
Trip Av. Humidity	45.47	%
Trip Av. GPS Altitude	558.22	m
Fuel Type	Petrol (E10)	

ave THC	13.12427	ppm
ave NMHC	13.78716	ppm
ave CH4	-0.66289	ppm
ave CO	21.56832	ppm
ave CO2	9.87882	%
ave NOx	9.31280	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	0.11316	g
tot NMHC	0.11649	g
tot CH4	0.00394	g
tot CO	0.80339	g
tot CO2	4328.78222	g
tot NO (d)	0.36622	g
tot NO2	0.00406	g
tot NOx	0.36647	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	35.02542	mi/hr
Trip Distance Share Urban	17.50148	% distance
Trip Distance Share Rural	66.15380	% distance
Trip Distance Share Motorway	16.34472	% distance

BS CO2	672.64004	g/hphr
BS CO	0.12484	g/hphr
BS THC	0.01758	g/hphr
BS NMHC	0.01810	g/hphr
BS CH4	0.00061	g/hphr
BS NO (d)	0.05691	g/hphr
BS NO2	0.00063	g/hphr
BS NOx	0.05694	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	238.94900	g/mi
DS CO	0.04435	g/mi
DS THC	0.00625	g/mi
DS NMHC	0.00643	g/mi
DS CH4	0.00022	g/mi
DS NO (d)	0.02022	g/mi
DS NO2	0.00022	g/mi
DS NOx	0.02023	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	3012.30121	g/kg
FS CO	0.55906	g/kg
FS THC	0.07875	g/kg
FS NMHC	0.08106	g/kg
FS CH4	0.00274	g/kg
FS NO (d)	0.25484	g/kg
FS NO2	0.00282	g/kg
FS NOx	0.25502	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: 504 Build 119, Serial Number: 1604
M.O.V.E Post-Processing: DT_1R4.1_B340
Legislation:

Vehicle: L447-2128 /
Engine: /
NOx Ambient Condition Corr.: 7 - CFR40 §1065.670
Dry / Wet Corr.: 2 - CFR40 §86.1342-90

Case: L447-2128
Page: Trip Summary Drift Corrected

'B1 Mountain Downhill'
Start Date: 05/13/2021
Start Time: 09:07:53.0

AVL
Concerto M.O.V.E, 2019

Trip Duration	1862.00	s
Trip Duration (a)	1862.00	s
Trip Distance	18.12	mi
Trip Distance (a)	18.12	mi
Trip Fuel Cons. (b)	1.44	kg
Trip Fuel Cons. (ab)	1.44	kg
Trip Fuel Cons. EU (ac)	1.43	kg
Trip Fuel Cons. US (ac)	1.42	kg
Trip Fuel Economy (b)	35.67	mpg_US
Trip Fuel Economy (ab)	35.67	mpg_US
Trip Fuel Economy EU (ac)	35.75	mpg_US
Trip Fuel Economy US (ac)	36.05	mpg_US
Trip Fuel Economy GGE (b)	35.67	mpg_US
Trip Fuel Economy GGE (ab)	35.67	mpg_US
Trip Fuel Economy EU GGE (ac)	35.75	mpg_US
Trip Fuel Economy US GGE (ac)	36.05	mpg_US
Trip Av. Eng. Speed	1738.94	rpm
Trip Av. Torque	34.00	lbft
Trip Av. Power	12.44	hp
Trip Work		
Trip Work (a)	6.44	hphr
Trip Exhaust Mass	24.44	kg
Trip Exhaust Mass EU (ac)	22.56	kg
Trip Exhaust Mass US (ac)	22.80	kg
Trip Av. Amb. Temperature	76.55	deg_F
Trip Av. Humidity	45.47	%
Trip Av. GPS Altitude	558.22	m
Fuel Type	Petrol (E10)	

ave THC DC	13.19993	ppm
ave NMHC DC	13.79461	ppm
ave CH4 DC	-0.59467	ppm
ave CO DC	21.58424	ppm
ave CO2 DC	9.87104	%
ave NOx DC	9.31660	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	0.11406	g
tot NMHC DC	0.11656	g
tot CH4 DC	0.00401	g
tot CO DC	0.80399	g
tot CO2 DC	4325.37284	g
tot NO DC (d)	0.36637	g
tot NO2 DC	0.00406	g
tot NOx DC	0.36662	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	35.02542	mi/hr
Trip Distance Share Urban	17.50148	% distance
Trip Distance Share Rural	66.15380	% distance
Trip Distance Share Motorway	16.34472	% distance

BS CO2 DC	672.11026	g/hphr
BS CO DC	0.12493	g/hphr
BS THC DC	0.01772	g/hphr
BS NMHC DC	0.01811	g/hphr
BS CH4 DC	0.00062	g/hphr
BS NO DC (d)	0.05693	g/hphr
BS NO2 DC	0.00063	g/hphr
BS NOx DC	0.05697	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	238.76080	g/mi
DS CO DC	0.04438	g/mi
DS THC DC	0.00630	g/mi
DS NMHC DC	0.00643	g/mi
DS CH4 DC	0.00022	g/mi
DS NO DC (d)	0.02022	g/mi
DS NO2 DC	0.00022	g/mi
DS NOx DC	0.02024	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	3009.92870	g/kg
FS CO DC	0.55948	g/kg
FS THC DC	0.07937	g/kg
FS NMHC DC	0.08111	g/kg
FS CH4 DC	0.00279	g/kg
FS NO DC (d)	0.25495	g/kg
FS NO2 DC	0.00282	g/kg
FS NOx DC	0.25512	g/kg
FS Soot	n/a	g/kg
FS Soot meas	n/a	g/kg
FS PM	n/a	g/kg
FS PN DC		

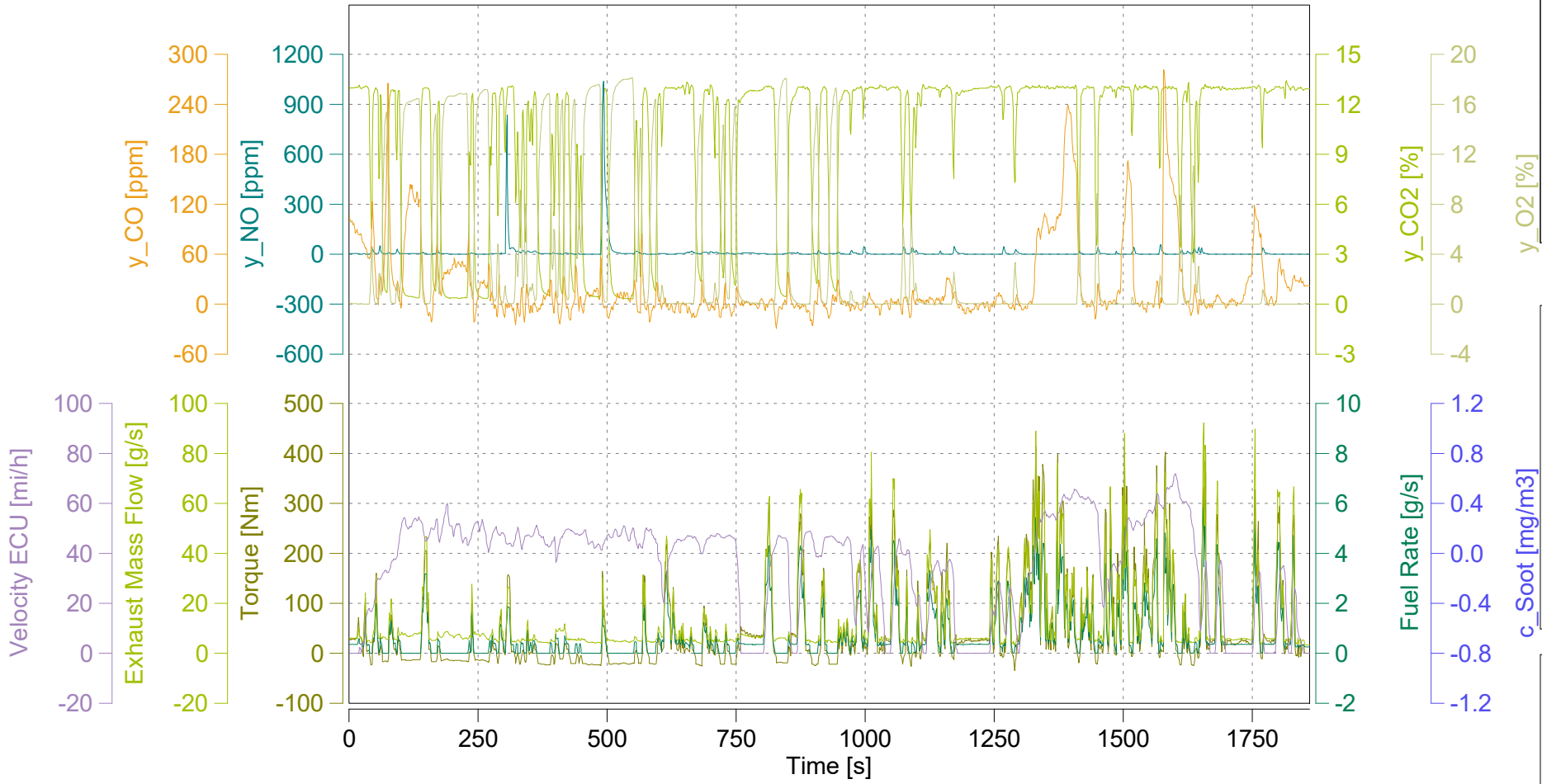
(a) GAS PEMS measurement state only, (b) based on fuel rate input (ECU, Fuel Meter), (c) Based on A/F ratio (eq 28-32 - R49)
(d) NO calculated using molecular weight of NO2, GGE=Gasoline Gallon Equivalents

Case: L447-2128
Page: Time Alignment Check

'B1 Mountain Downhill'
Start Date: 05/13/2021
Start Time: 09:07:53.0

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 Plo

Reset Time

Reset Al

Apply Curr

Concerto Version: 504 Build 119, Serial Number: 1604
M.O.V.E Post-Processing: DT_1R4.1_B340
Legislation:

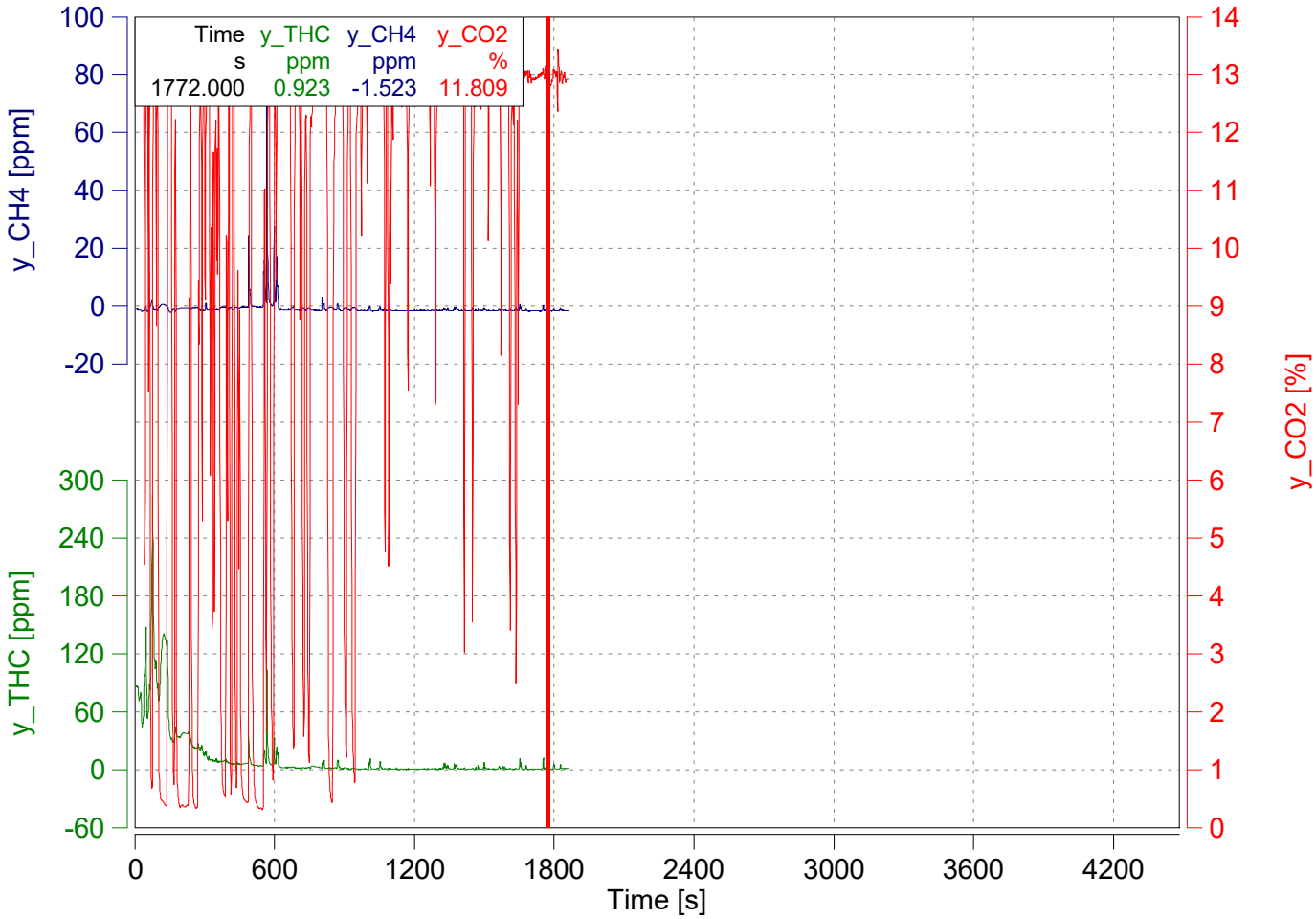
Vehicle: L447-2128 /
Engine: /
NOx Ambient Condition Corr.: 7 - CFR40 §1065.670
Dry / Wet Corr.: 2 - CFR40 §86.1342-90

Case: L447-2128
Page: Time Alignment of Gas Concentrations

'B1 Mountain Downhill'
Start Date: 05/13/2021
Start Time: 09:07:53.0

AVL

Concerto M.O.V.E, 2019



Absolute Time Shifts

y_THC	s	-5.2
y_CH4	s	-7.2

Reset Time Shifts in Plot

Apply Current Values

Concerto Version: 504 Build 119, Serial Number: 1604
M.O.V.E Post-Processing: DT_1R4.1_B340
Legislation:

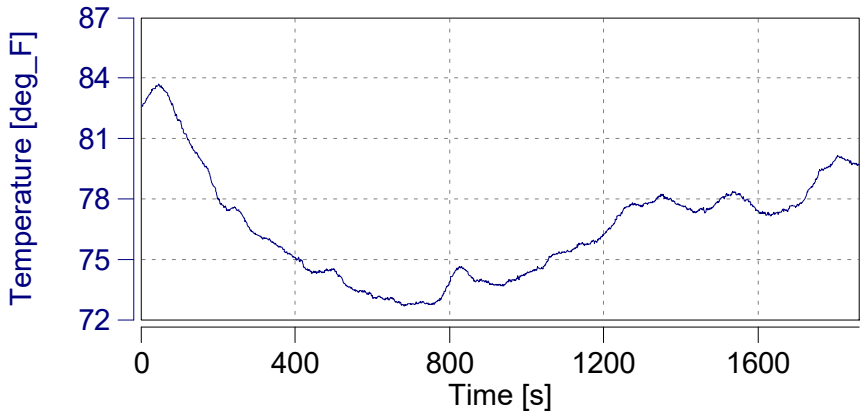
Vehicle: L447-2128 /
Engine: /
NOx Ambient Condition Corr.: 7 - CFR40 §1065.670
Dry / Wet Corr.: 2 - CFR40 §86.1342-90

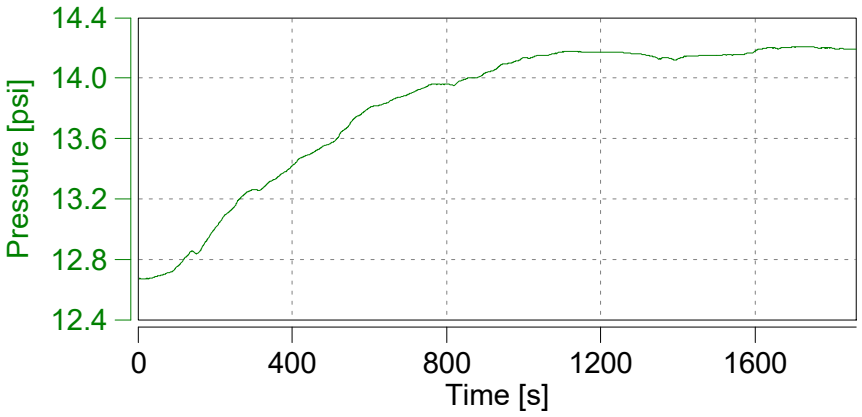
Case: L447-2128
Page: Ambient Conditions

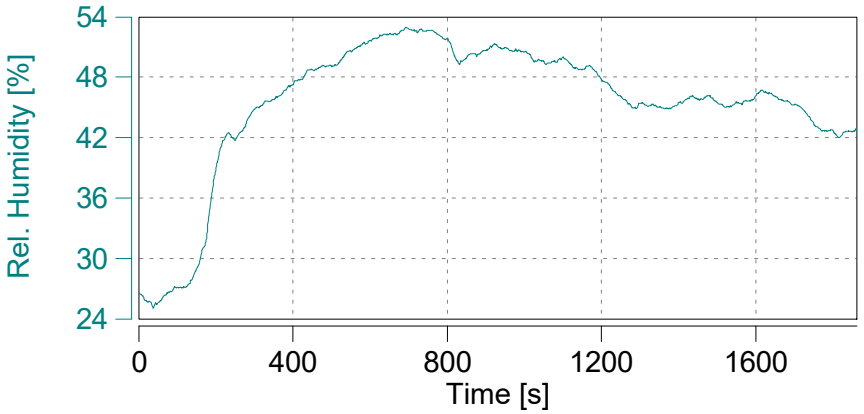
'B1 Mountain Downhill'
Start Date: 05/13/2021
Start Time: 09:07:53.0

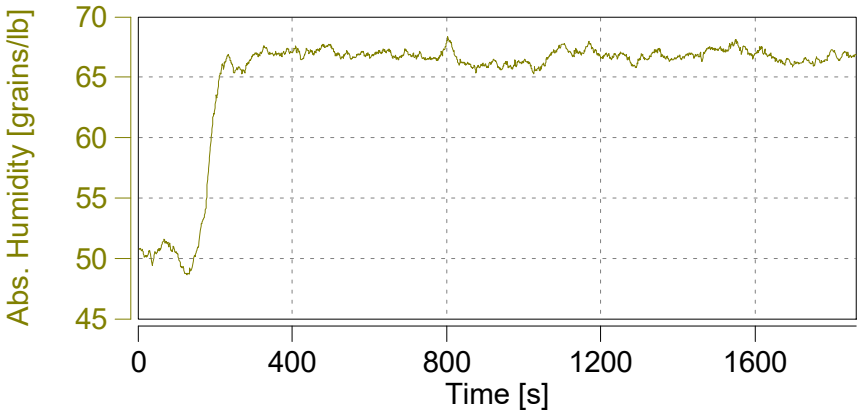
AVL

Concerto M.O.V.E, 2019









Concerto Version: 504 Build 119, Serial Number: 1604
M.O.V.E Post-Processing: DT_1R4.1_B340
Legislation:

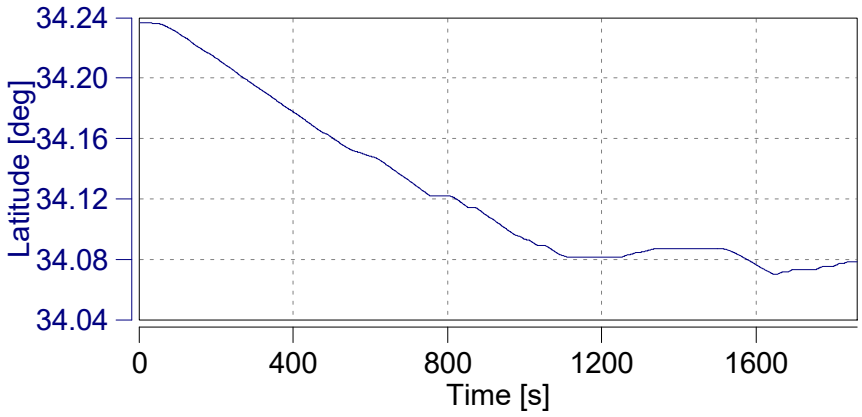
Vehicle: L447-2128 /
Engine: /
NOx Ambient Condition Corr.: 7 - CFR40 §1065.670
Dry / Wet Corr.: 2 - CFR40 §86.1342-90

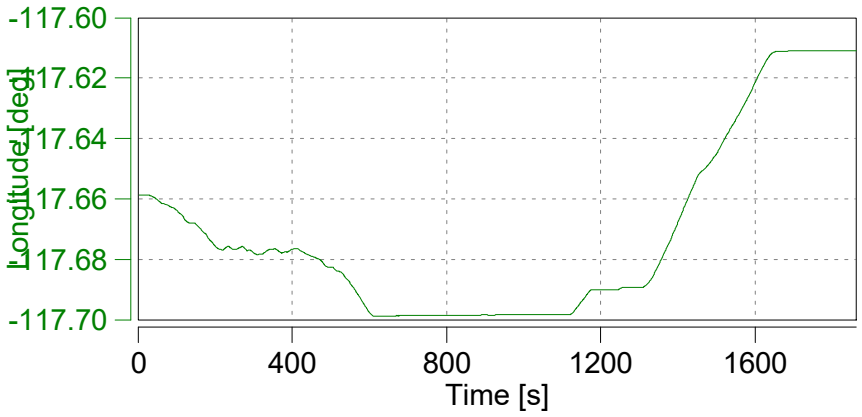
Case: L447-2128
Page: GPS

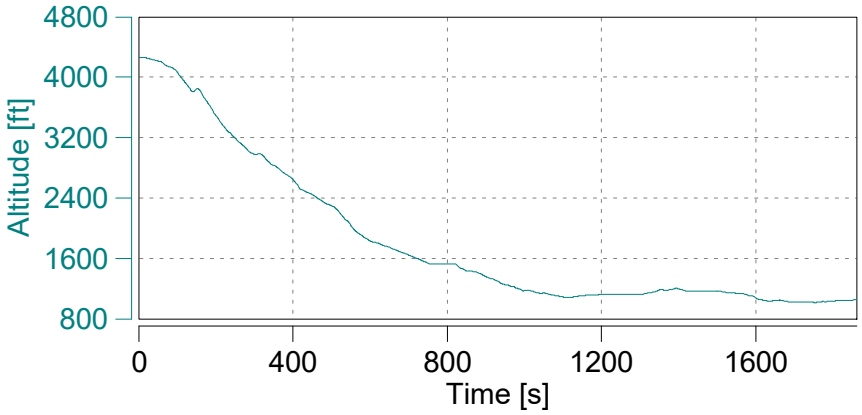
'B1 Mountain Downhill'
Start Date: 05/13/2021
Start Time: 09:07:53.0

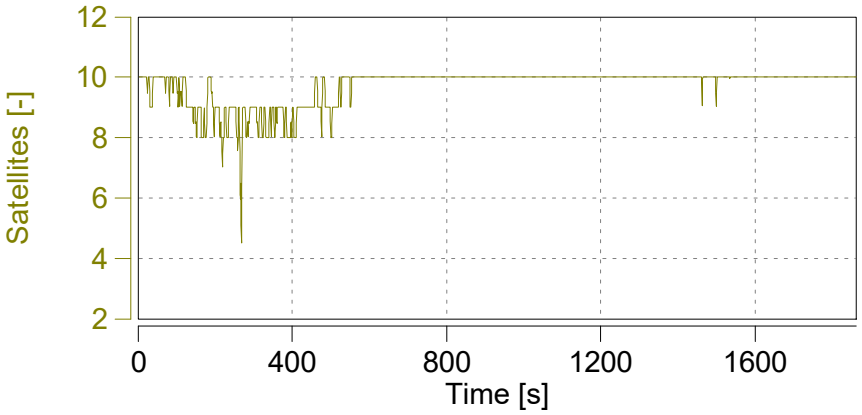
AVL

Concerto M.O.V.E, 2019









Concerto Version: 504 Build 119, Serial Number: 1604
M.O.V.E Post-Processing: DT_1R4.1_B340
Legislation:

Vehicle: L447-2128 /
Engine: /
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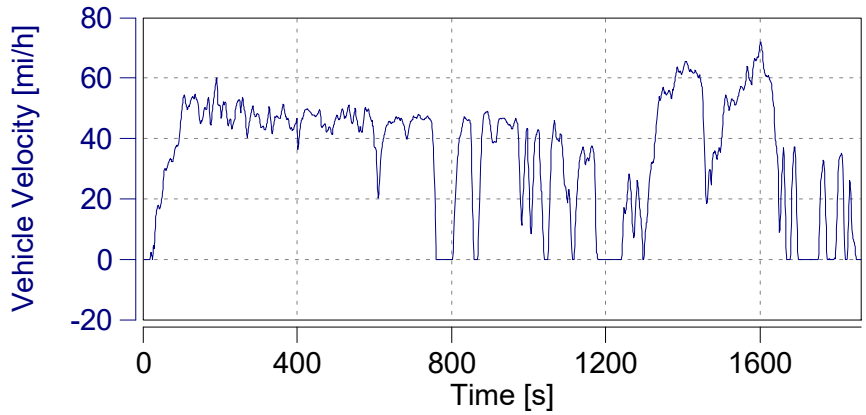
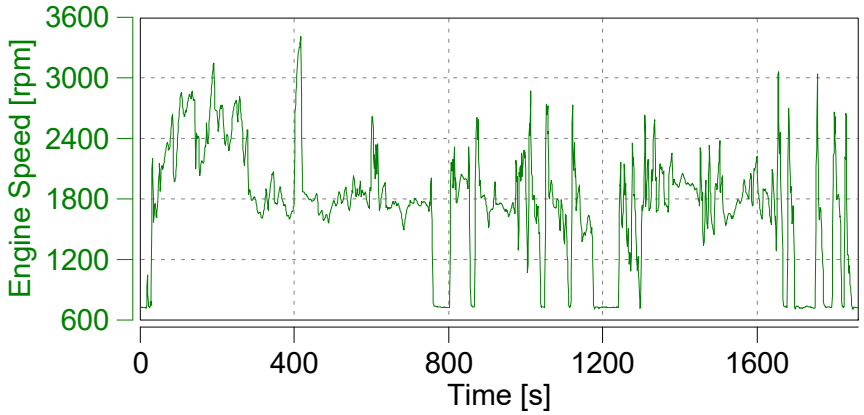
Case: L447-2128
Page: Engine (1)

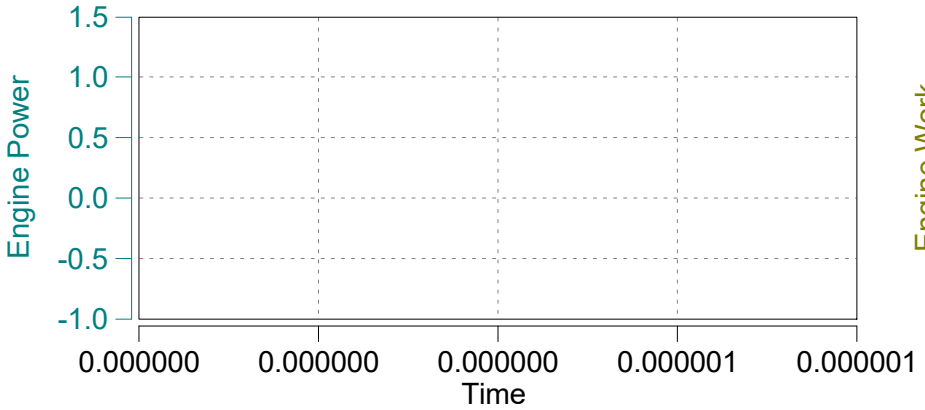
'B1 Mountain Downhill'
Start Date: 05/13/2021
Start Time: 09:07:53.0

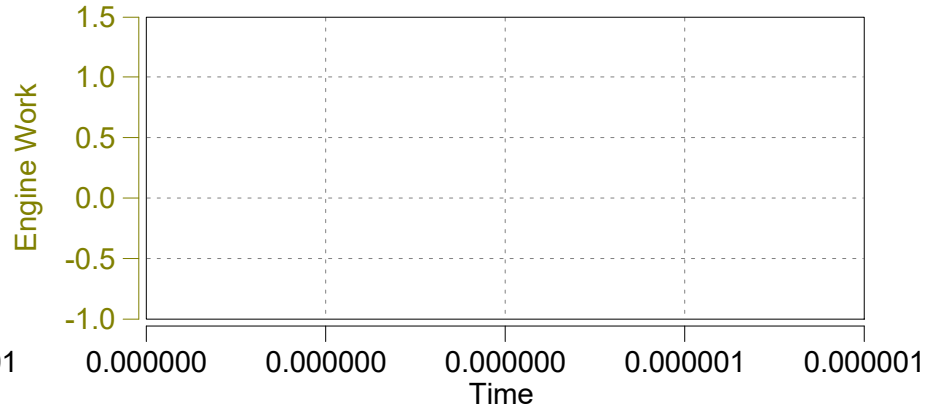
AVL

Concerto M.O.V.E, 2019









Concerto Version: 504 Build 119, Serial Number: 1604
M.O.V.E Post-Processing: DT_1R4.1_B340
Legislation:

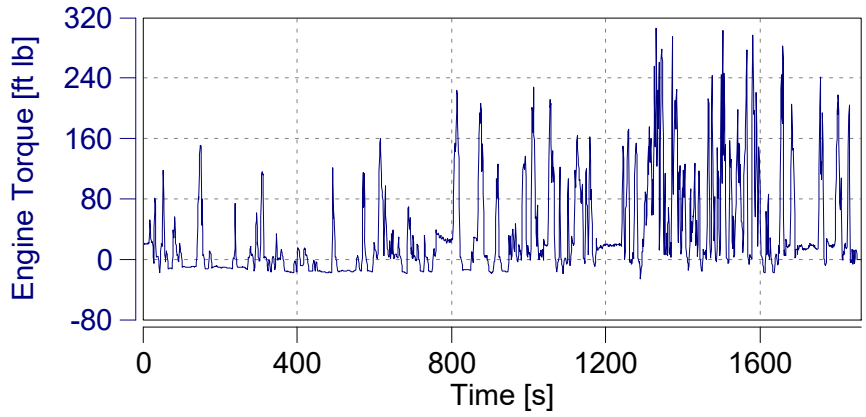
Vehicle: L447-2128 /
Engine: /
NOx Ambient Condition Corr.: 7 - CFR40 §1065.670
Dry / Wet Corr.: 2 - CFR40 §86.1342-90

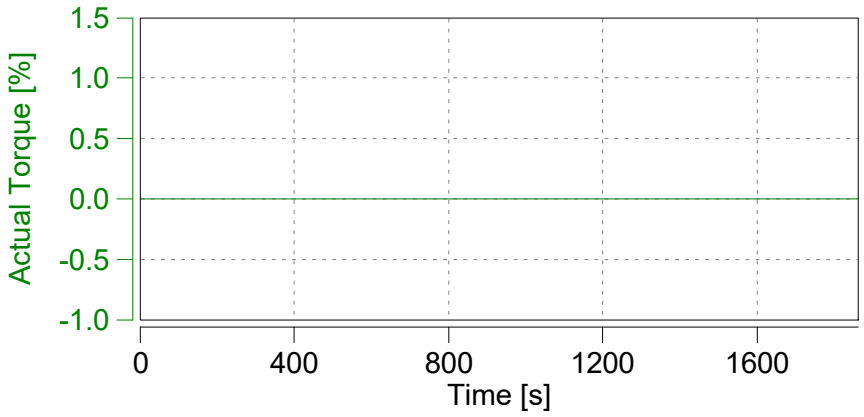
Case: L447-2128
Page: Engine (2)

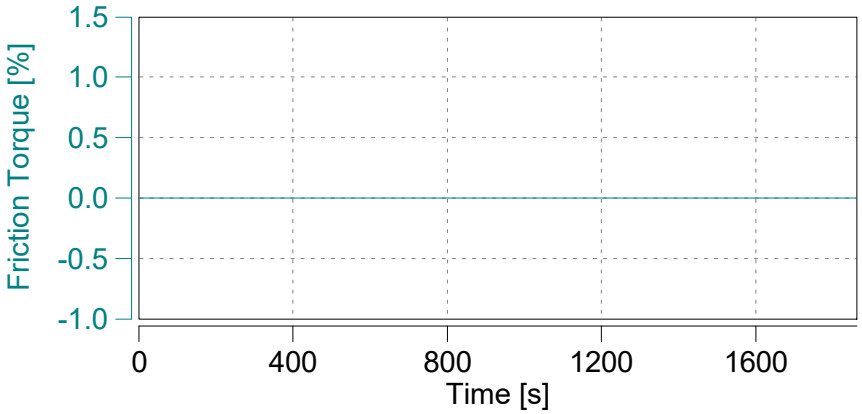
'B1 Mountain Downhill'
Start Date: 05/13/2021
Start Time: 09:07:53.0

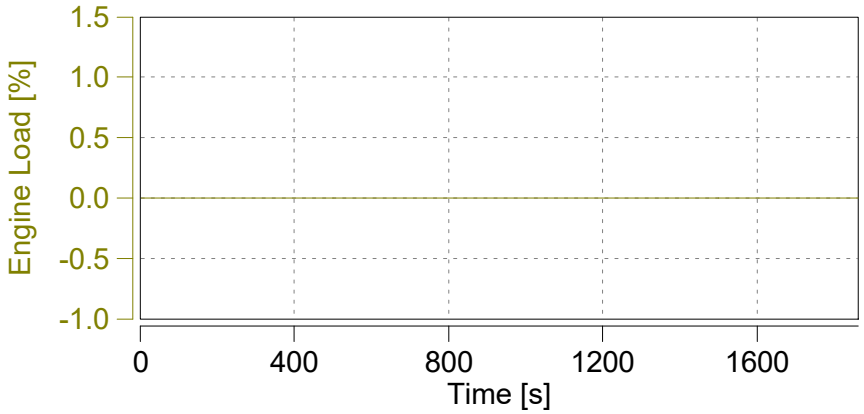
AVL

Concerto M.O.V.E, 2019









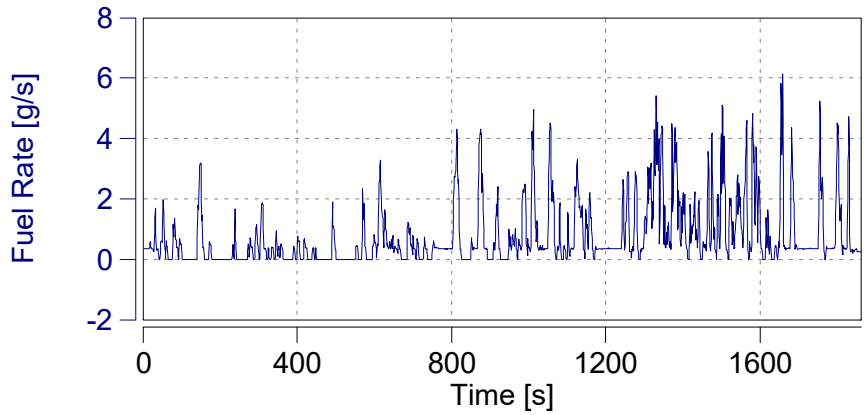
Concerto Version: 504 Build 119, Serial Number: 1604
M.O.V.E Post-Processing: DT_1R4.1_B340
Legislation:

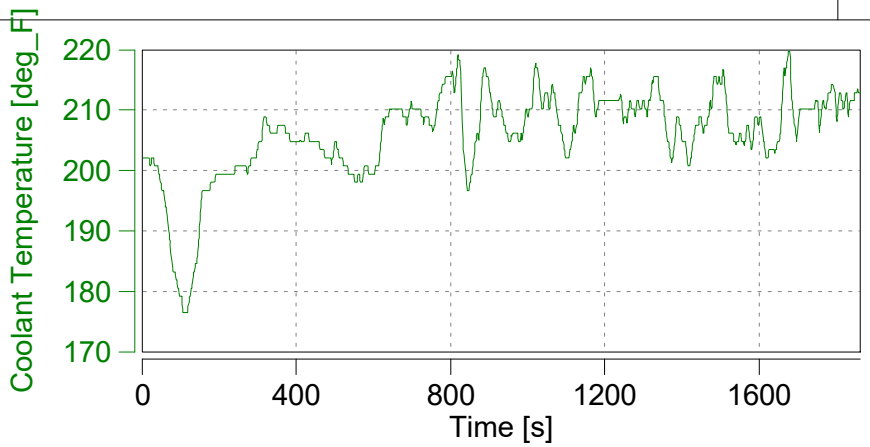
Vehicle: L447-2128 /
Engine: /
NOx Ambient Condition Corr.: 7 - CFR40 §1065.670
Dry / Wet Corr.: 2 - CFR40 §86.1342-90

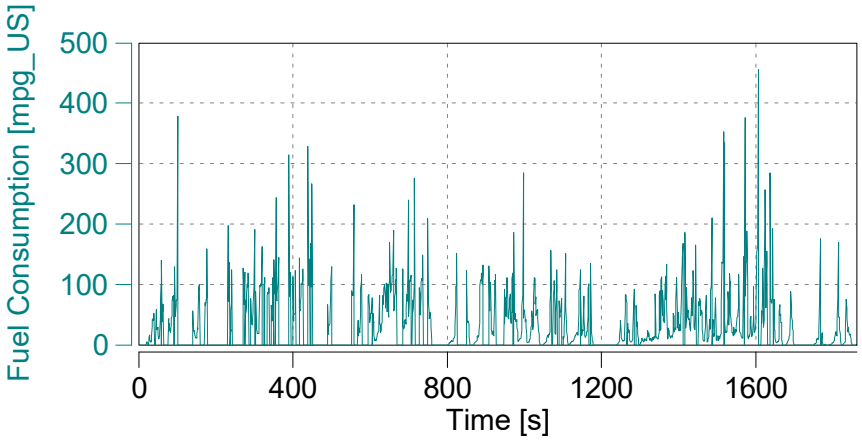
'B1 Mountain Downhill'
Start Date: 05/13/2021
Start Time: 09:07:53.0

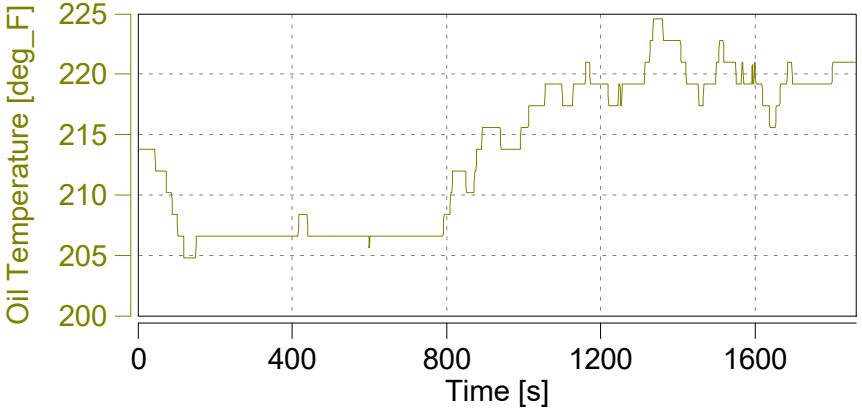
AVL

Concerto M.O.V.E, 2019









Concerto Version: 504 Build 119, Serial Number: 1604
M.O.V.E Post-Processing: DT_1R4.1_B340
Legislation:

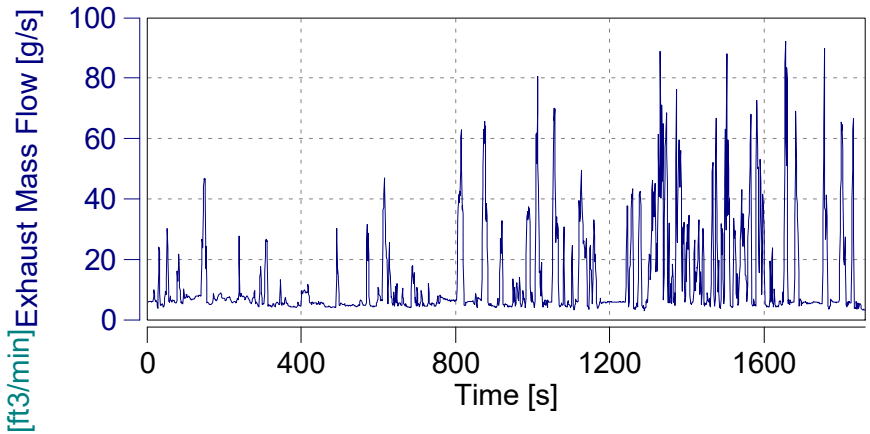
Vehicle: L447-2128 /
Engine: /
NOx Ambient Condition Corr.: 7 - CFR40 §1065.670
Dry / Wet Corr.: 2 - CFR40 §86.1342-90

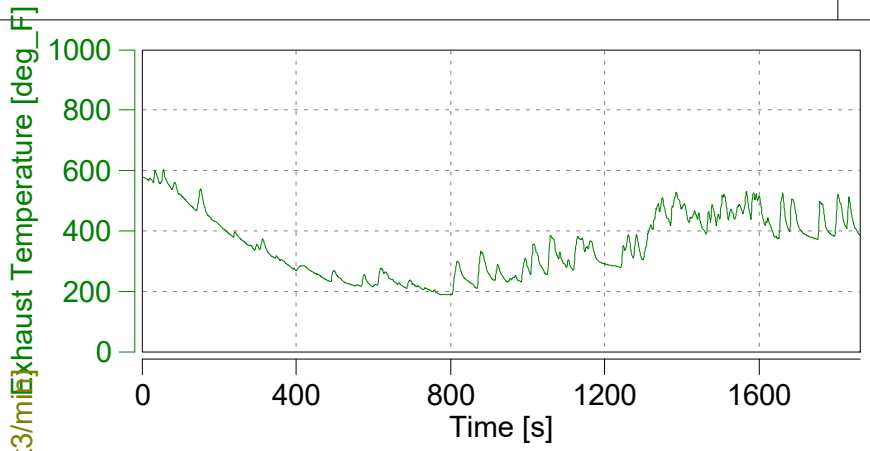
Case: L447-2128
Page: Exhaust Flow (1)

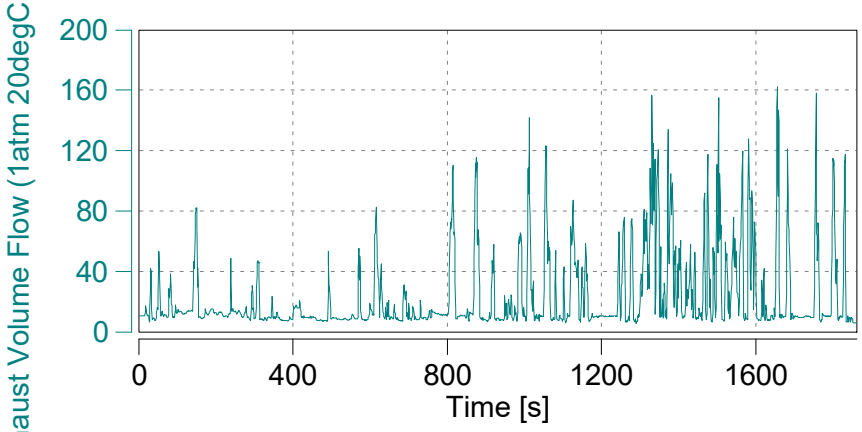
'B1 Mountain Downhill'
Start Date: 05/13/2021
Start Time: 09:07:53.0

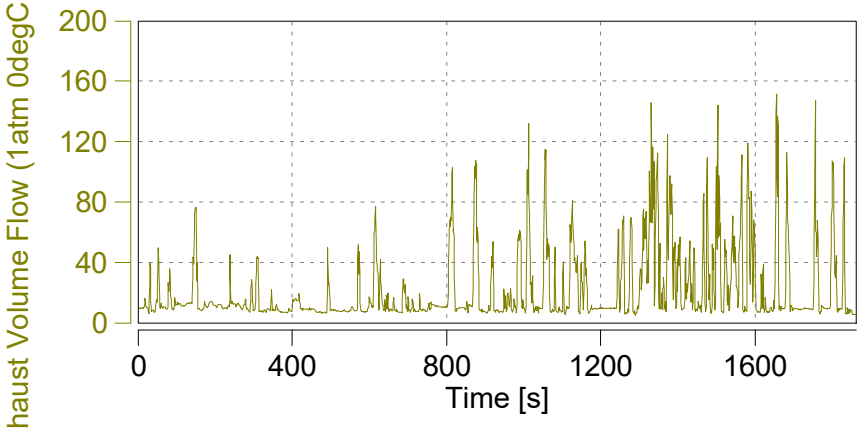
AVL

Concerto M.O.V.E, 2019









Concerto Version: 504 Build 119, Serial Number: 1604
M.O.V.E Post-Processing: DT_1R4.1_B340
Legislation:

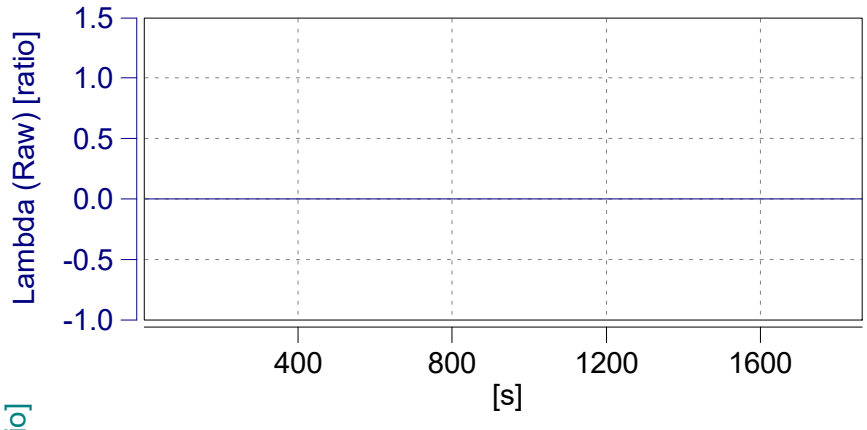
Vehicle: L447-2128 /
Engine: /
NOx Ambient Condition Corr.: 7 - CFR40 §1065.670
Dry / Wet Corr.: 2 - CFR40 §86.1342-90

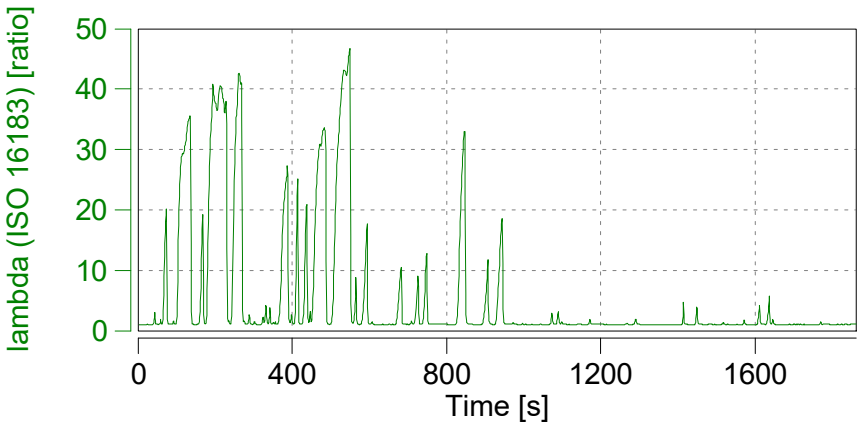
Case: L447-2128
Page: Exhaust Flow (2)

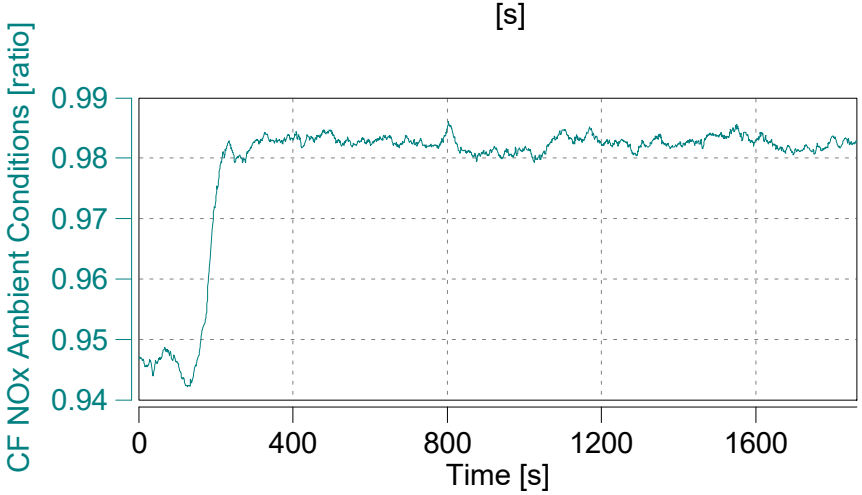
'B1 Mountain Downhill'
Start Date: 05/13/2021
Start Time: 09:07:53.0

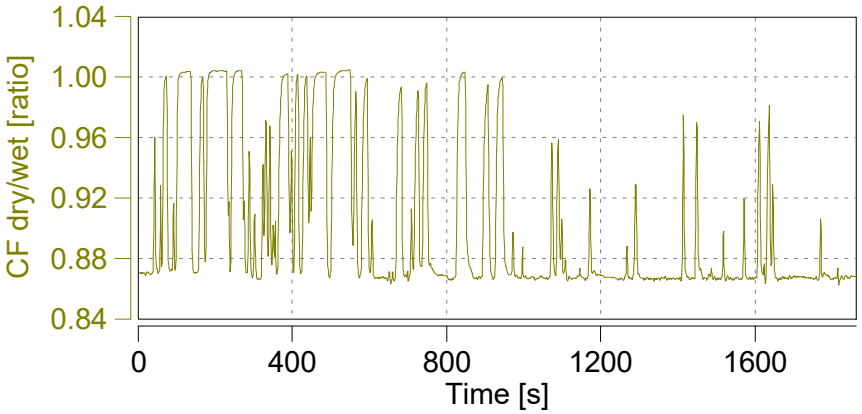
AVL

Concerto M.O.V.E, 2019









Concerto Version: 504 Build 119, Serial Number: 1604
M.O.V.E Post-Processing: DT_1R4.1_B340
Legislation:

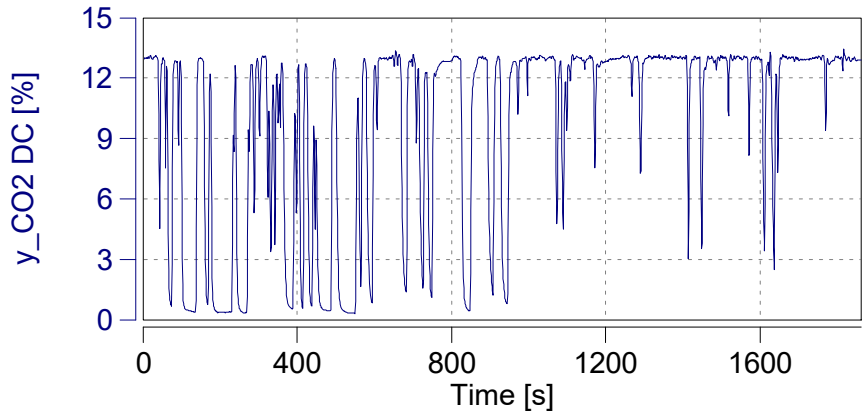
Vehicle: L447-2128 /
Engine: /
NOx Ambient Condition Corr.: 7 - CFR40 §1065.670
Dry / Wet Corr.: 2 - CFR40 §86.1342-90

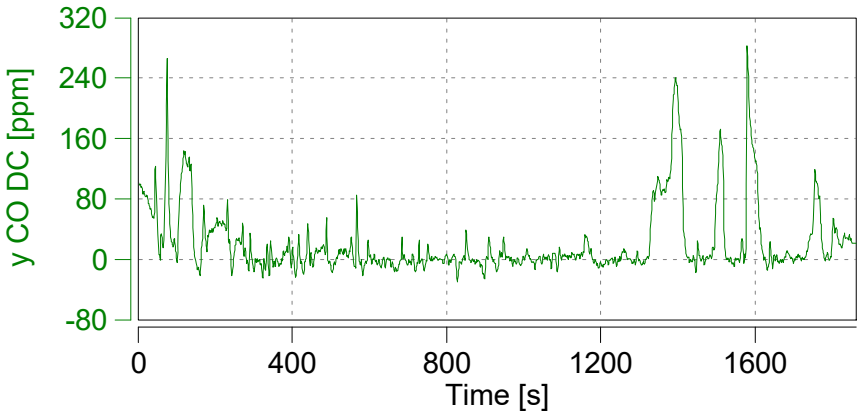
Case: L447-2128
Page: Corrected Emissions (1)

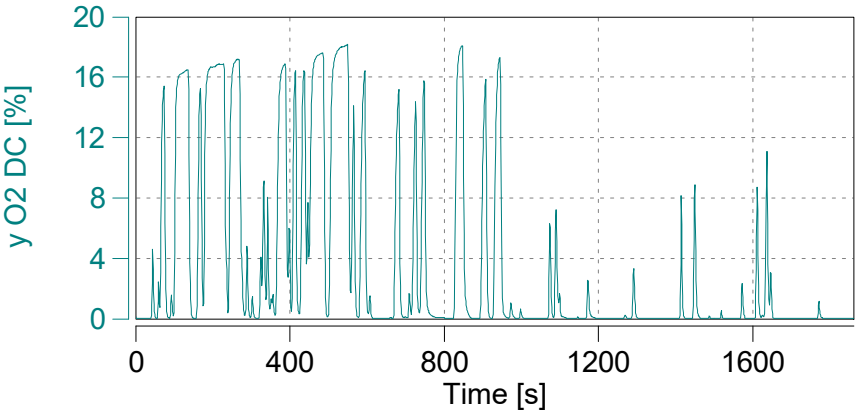
'B1 Mountain Downhill'
Start Date: 05/13/2021
Start Time: 09:07:53.0

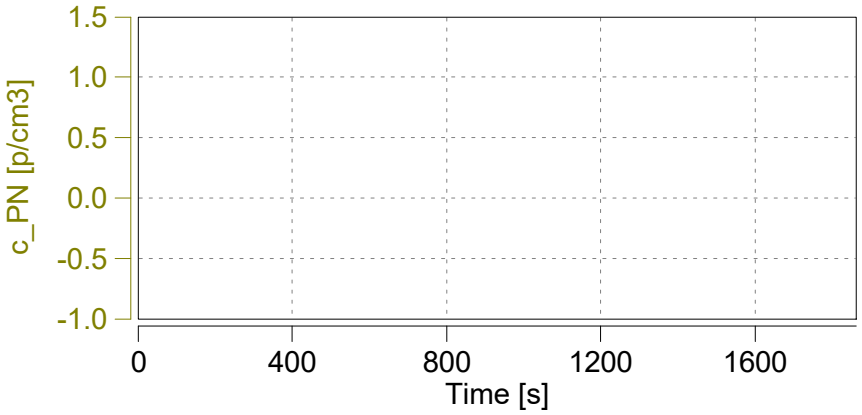
AVL

Concerto M.O.V.E, 2019









Concerto Version: 504 Build 119, Serial Number: 1604
M.O.V.E Post-Processing: DT_1R4.1_B340
Legislation:

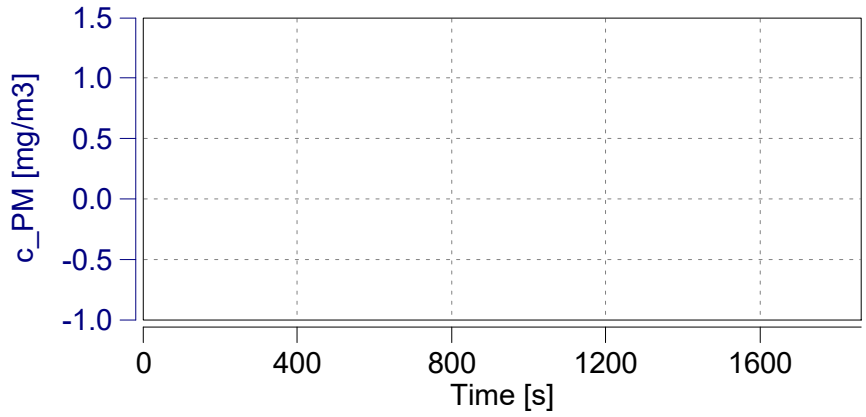
Vehicle: L447-2128 /
Engine: /
NOx Ambient Condition Corr.: 7 - CFR40 §1065.670
Dry / Wet Corr.: 2 - CFR40 §86.1342-90

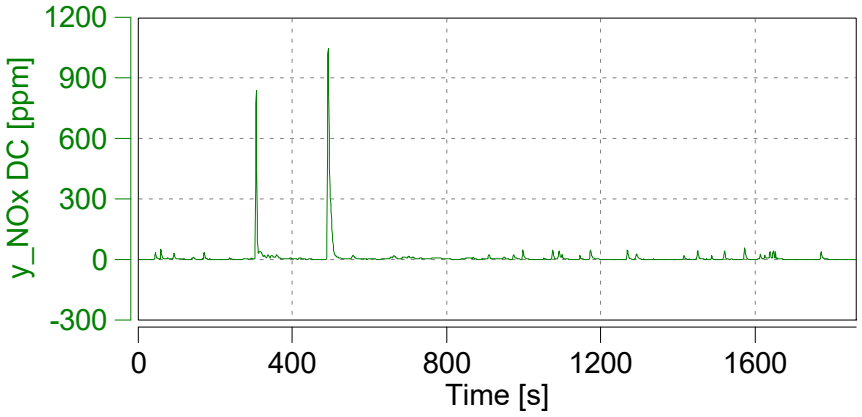
Case: L447-2128
Page: Corrected Emissions (2)

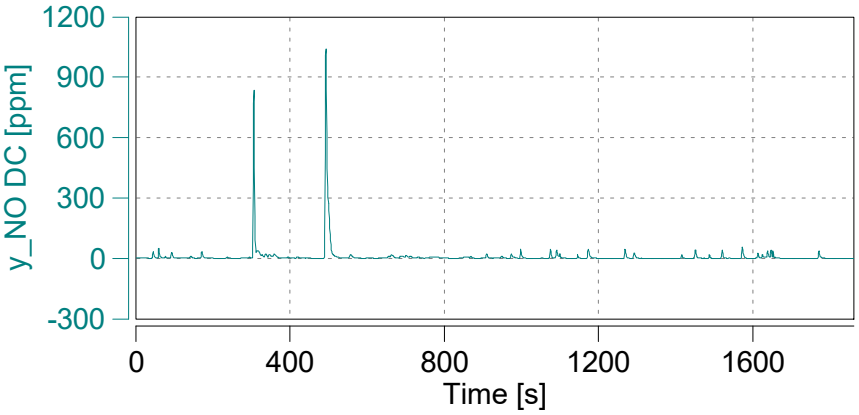
'B1 Mountain Downhill'
Start Date: 05/13/2021
Start Time: 09:07:53.0

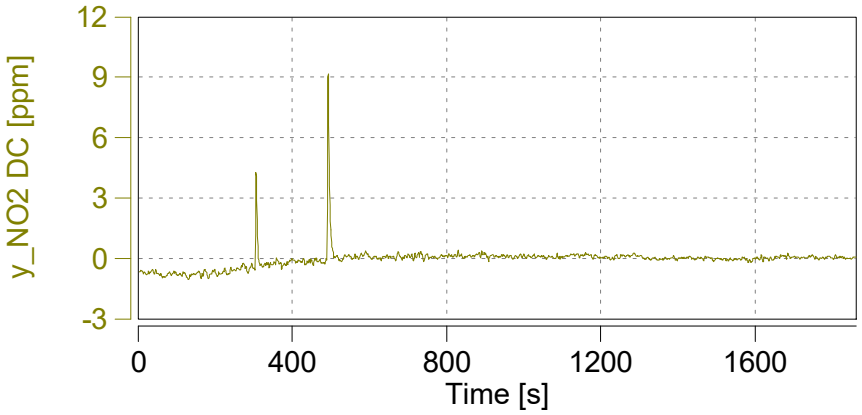
AVL

Concerto M.O.V.E, 2019









Concerto Version: 504 Build 119, Serial Number: 1604
M.O.V.E Post-Processing: DT_1R4.1_B340
Legislation:

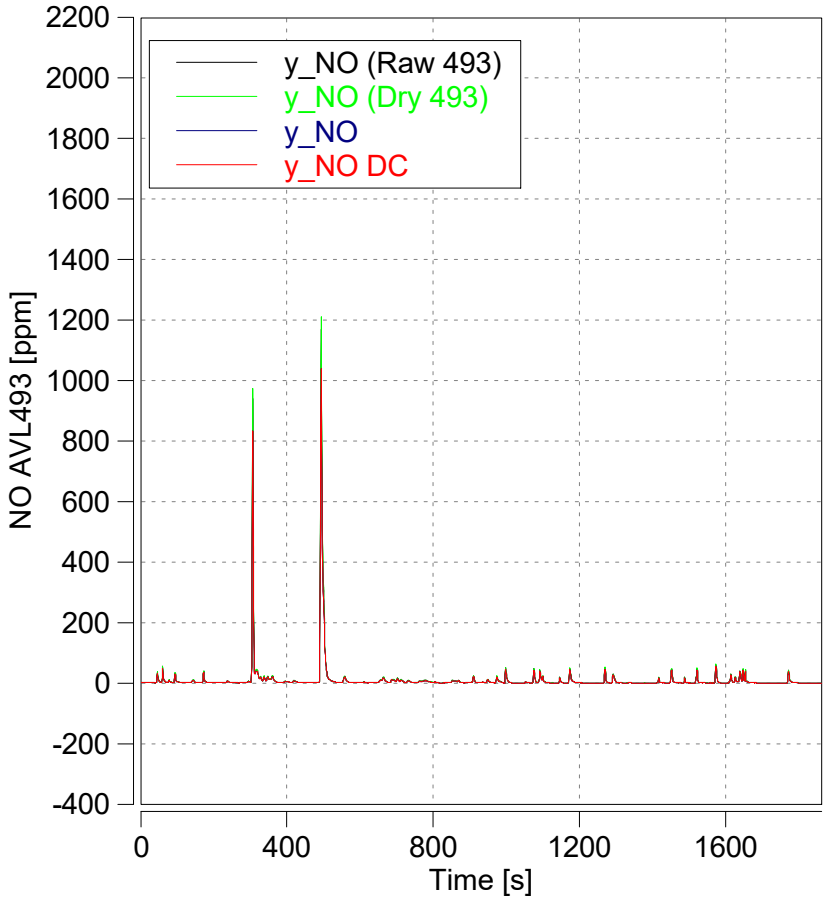
Vehicle: L447-2128 /
Engine: /
NOx Ambient Condition Corr.: 7 - CFR40 §1065.670
Dry / Wet Corr.: 2 - CFR40 §86.1342-90

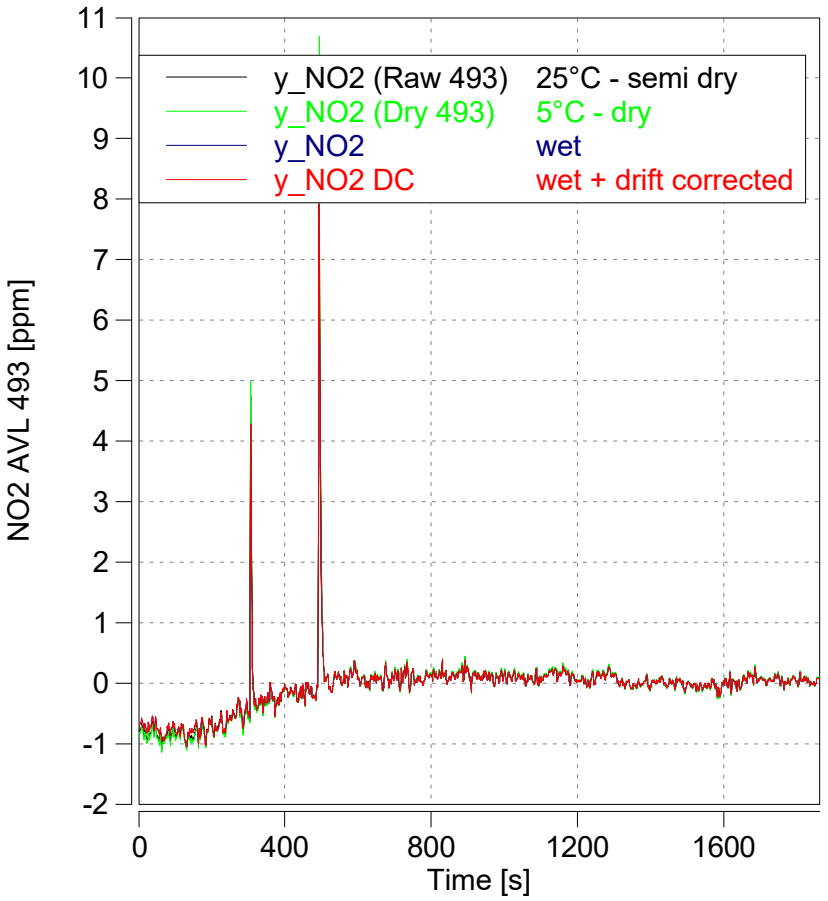
Case: L447-2128
Page: Corrected Emissions (3)

'B1 Mountain Downhill'
Start Date: 05/13/2021
Start Time: 09:07:53.0

AVL

Concerto M.O.V.E, 2019

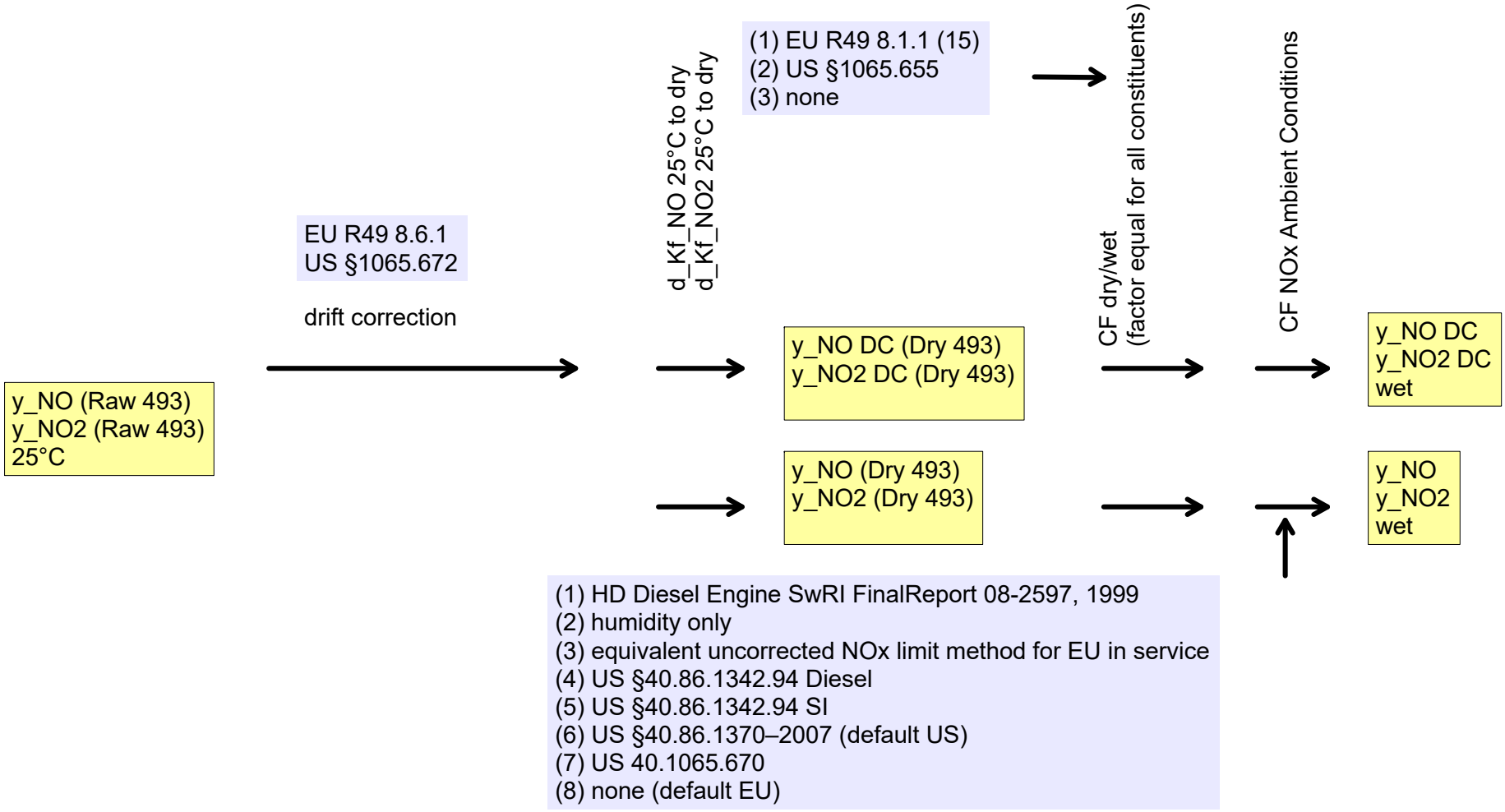




Concerto Version: 504 Build 119, Serial Number: 1604
M.O.V.E Post-Processing: DT_1R4.1_B340
Legislation:

Vehicle: L447-2128 /
Engine: /
NOx Ambient Condition Corr.: 7 - CFR40 §1065.670
Dry / Wet Corr.: 2 - CFR40 §86.1342-90

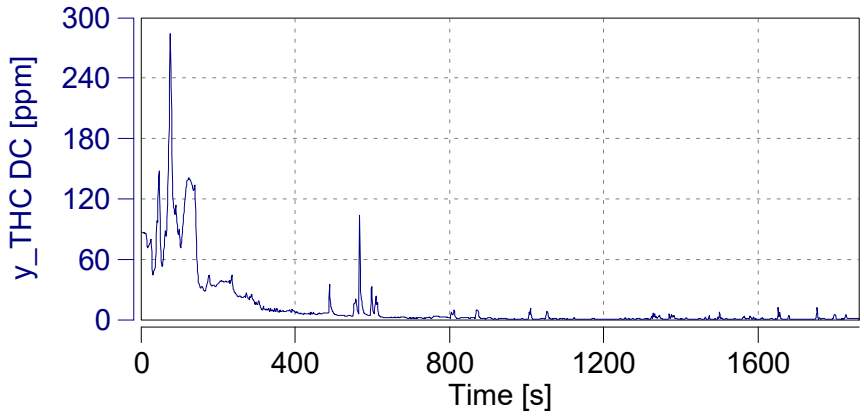
NOx - AVL 493

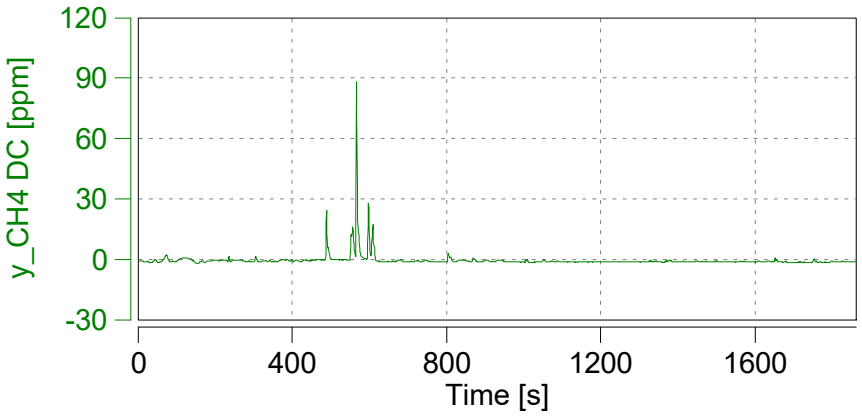

y_NO (Raw 493)
y_NO2 (Raw 493)
25°C
EU R49 8.6.1
US §1065.672
drift correction
d_Kf_NO 25°C to dry
d_Kf_NO2 25°C to dry
(1) EU R49 8.1.1 (15)
(2) US §1065.655
(3) none
y_NO DC (Dry 493)
y_NO2 DC (Dry 493)
y_NO (Dry 493)
y_NO2 (Dry 493)
CF dry/wet
(factor equal for all constituents)
CF NOx Ambient Conditions
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)

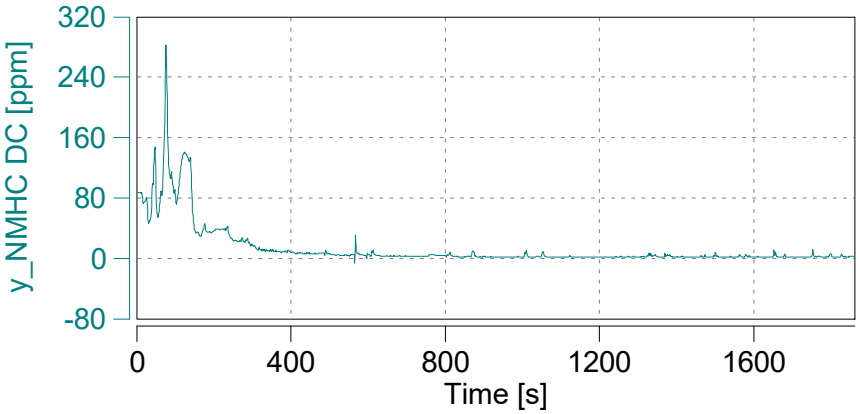
'B1 Mountain Downhill'
Start Date: 05/13/2021
Start Time: 09:07:53.0

AVL

Concerto M.O.V.E, 2019







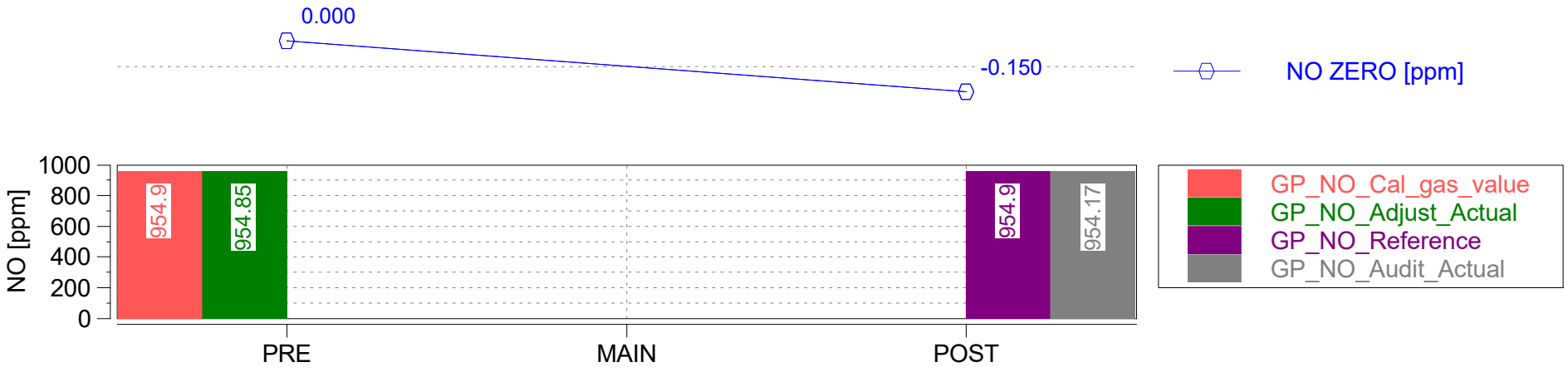
Concerto Version: 504 Build 119, Serial Number: 1604
M.O.V.E Post-Processing: DT_1R4.1_B340
Legislation:

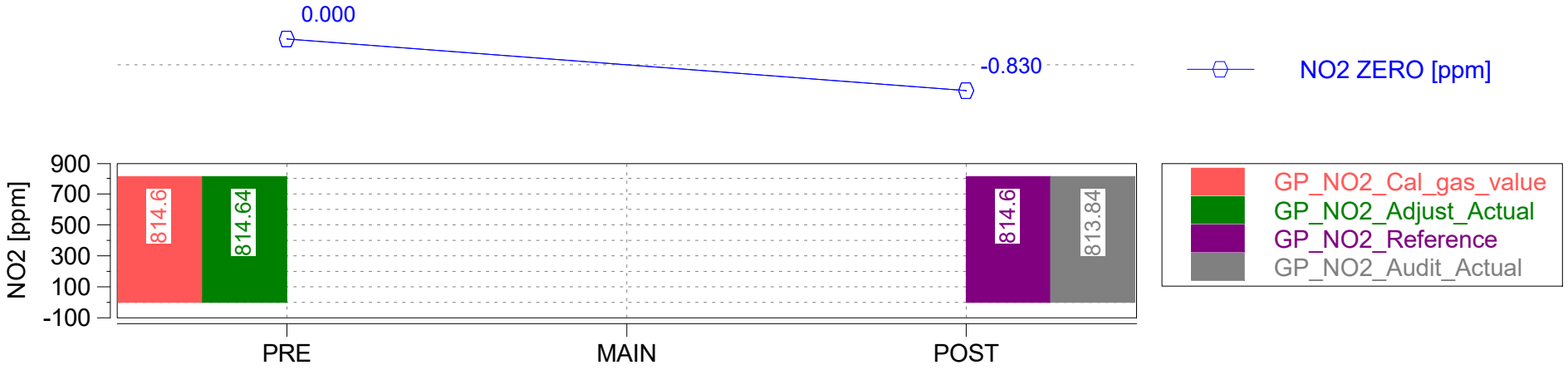
Vehicle: L447-2128 /
Engine: /
NOx Ambient Condition Corr.: 7 - CFR40 §1065.670
Dry / Wet Corr.: 2 - CFR40 §86.1342-90

Case: L447-2128
Page: NO/NO2/NOx Zero - Span

'B1 Mountain Downhill'
Start Date: 05/13/2021
Start Time: 09:07:53.0

AVL
Concerto M.O.V.E, 2019





Concerto Version: 504 Build 119, Serial Number: 1604
M.O.V.E Post-Processing: DT_1R4.1_B340
Legislation:

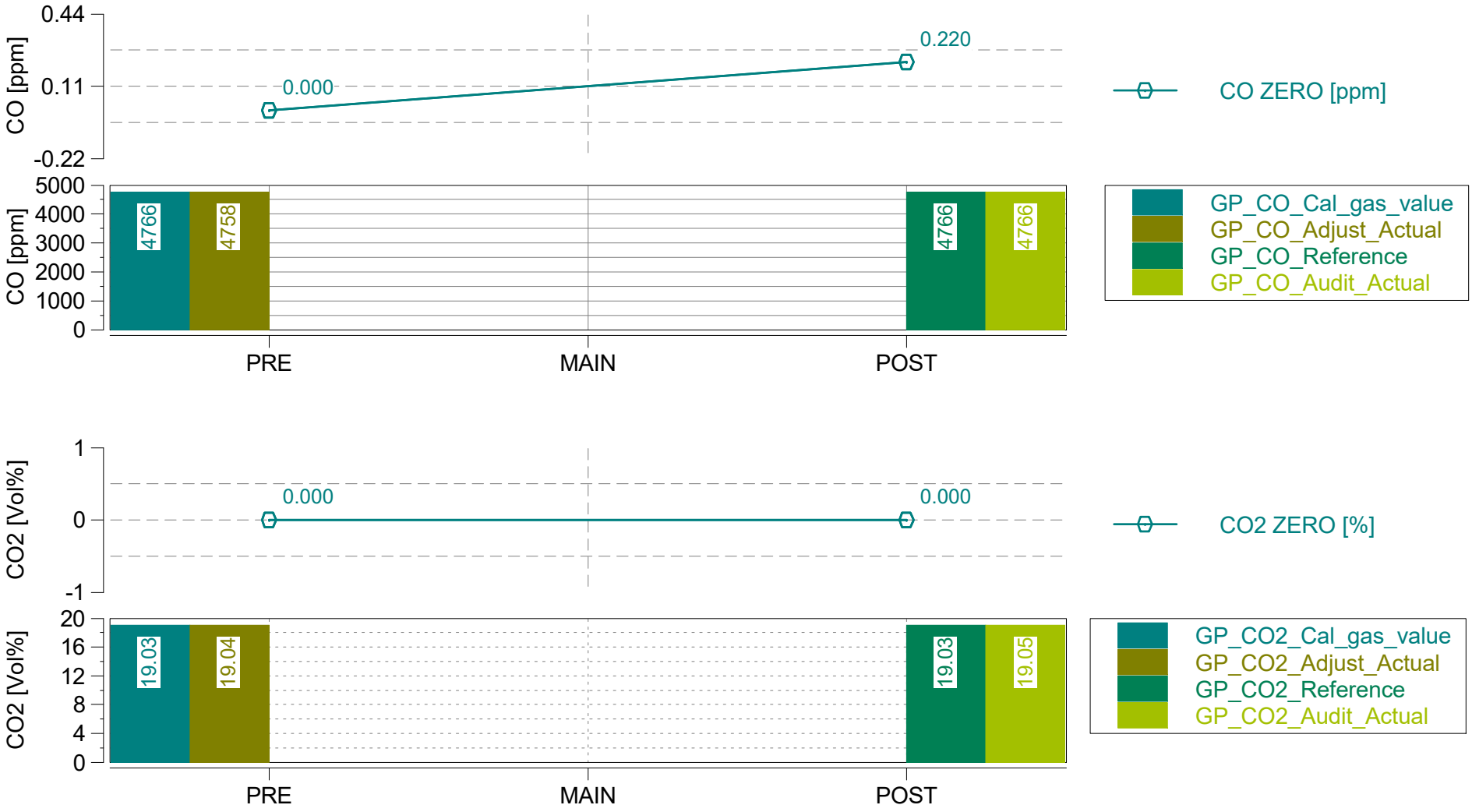
Vehicle: L447-2128 /
Engine: /
NOx Ambient Condition Corr.: 7 - CFR40 §1065.670
Dry / Wet Corr.: 2 - CFR40 §86.1342-90

Case: L447-2128
Page: CO/CO2 Zero - Span

'B1 Mountain Downhill'
Start Date: 05/13/2021
Start Time: 09:07:53.0

AVL

Concerto M.O.V.E, 2019



Concerto Version: 504 Build 119, Serial Number: 1604
M.O.V.E Post-Processing: DT_1R4.1_B340
Legislation:

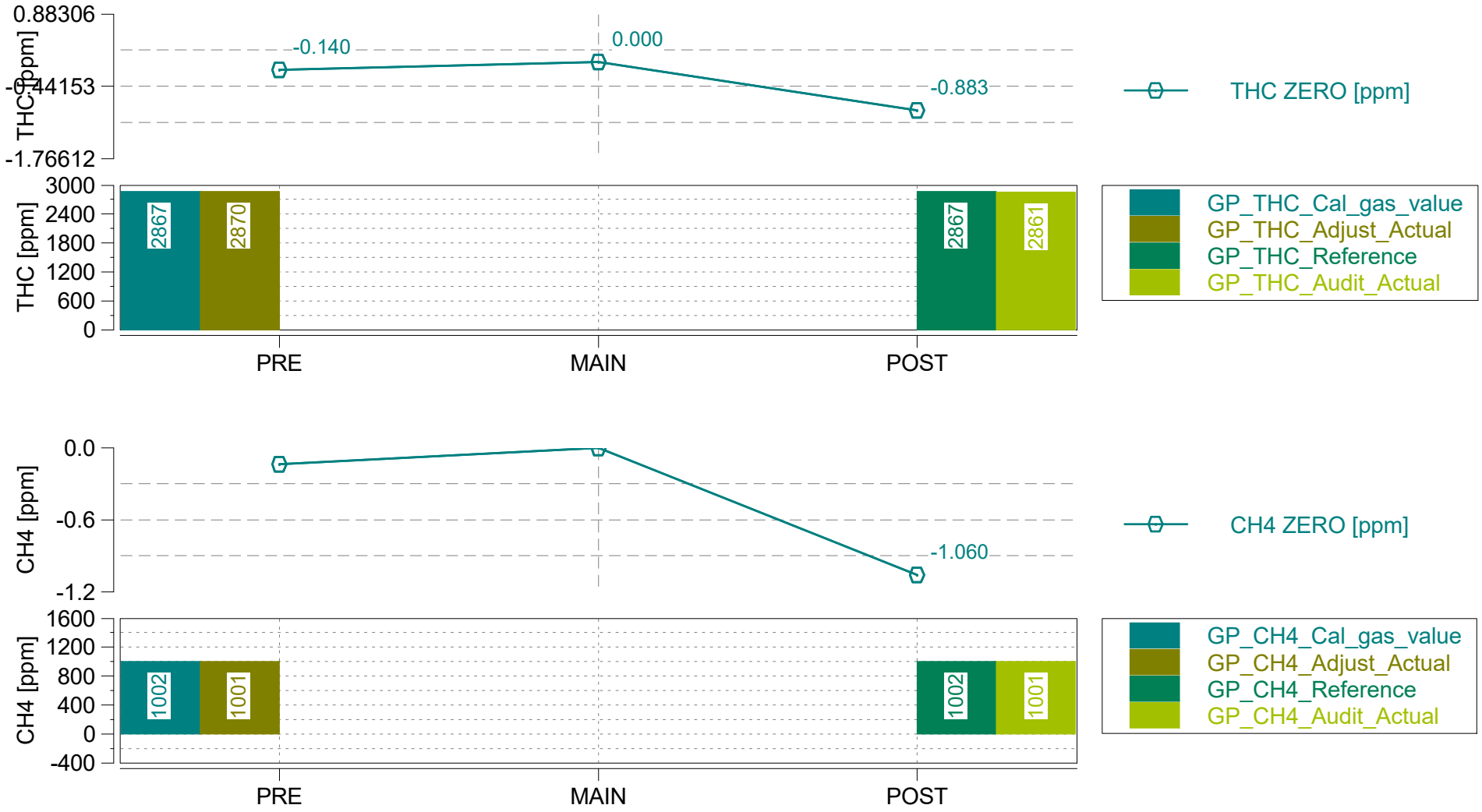
Vehicle: L447-2128 /
Engine: /
NOx Ambient Condition Corr.: 7 - CFR40 §1065.670
Dry / Wet Corr.: 2 - CFR40 §86.1342-90

Case: L447-2128
Page: THC/CH4 Zero - Span

'B1 Mountain Downhill'
Start Date: 05/13/2021
Start Time: 09:07:53.0

AVL

Concerto M.O.V.E, 2019



Concerto Version: 504 Build 119, Serial Number: 1604
M.O.V.E Post-Processing: DT_1R4.1_B340
Legislation:

Vehicle: L447-2128 /
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%	**0.07**	**%**	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	0597
Firmware Version	V1.16
Main Test Date	2021-05-13
Leak Check Age [days]	0

Device ID	AVL4925
Serial Number	175
Firmware Version	1.20.0.8

EFM

Device ID	AVL495
Serial Number	00915
Serial Number Tube	01115
Firmware Version	V1.13

System Control

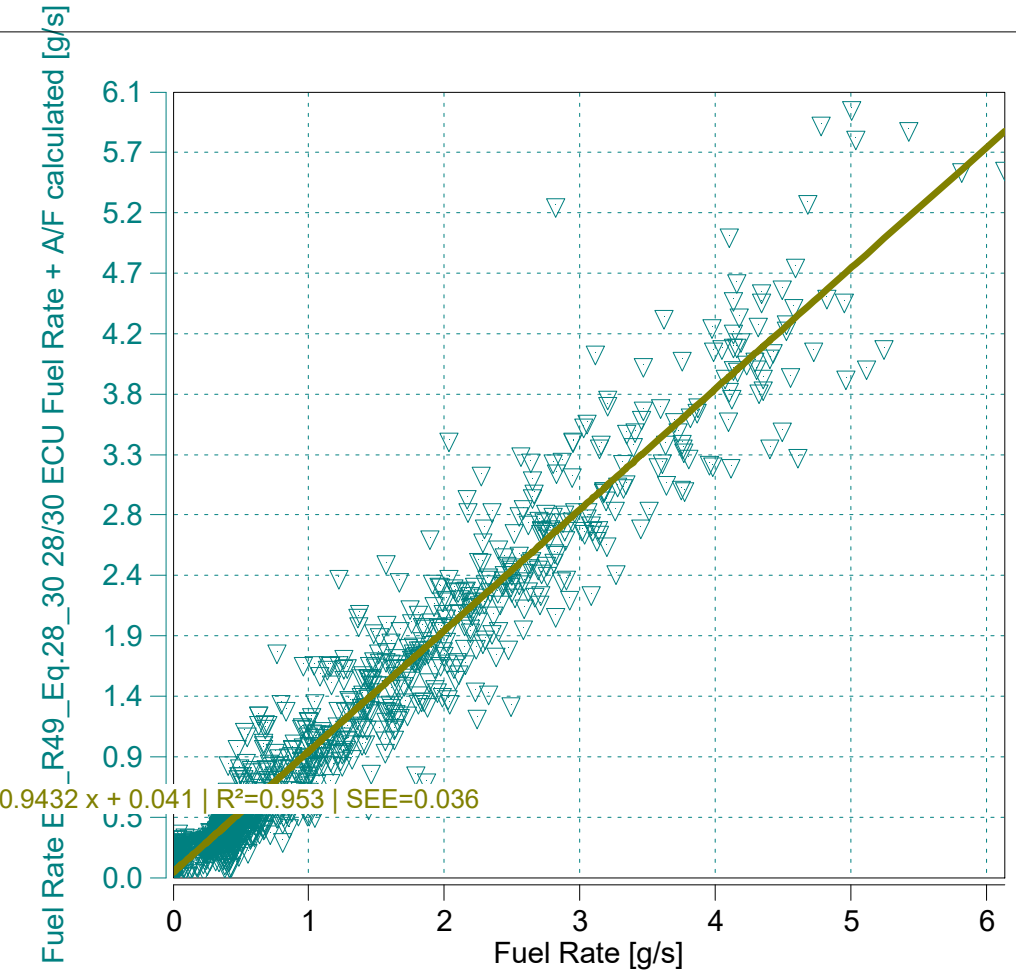
SC Version	V2.6_212
SC Serial Number	60300923

Case: L447-2128
Page: Fuel Rate ECU vs. Calculated

'B1 Mountain Downhill'
Start Date: 05/13/2021
Start Time: 09:07:53.0

AVL

Concerto M.O.V.E, 2019



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

y = 0.9432 x + 0.041 | R²=0.953 | SEE=0.036
m = 0.94 (0.9 - 1.1 recommended)
R² = 0.95 (min 0.9 mandatory)

Data from - to [% of Maximum]

0 | 100

Concerto Version: 504 Build 119, Serial Number: 1604
M.O.V.E Post-Processing: DT_1R4.1_B340
Legislation:

Vehicle: L447-2128 /
Engine: /
NOx Ambient Condition Corr.: 7 - CFR40 §1065.670
Dry / Wet Corr.: 2 - CFR40 §86.1342-90

Case: L447-2128
Page: Trip Summary

'A0 LATC>CARB'
Start Date: 05/13/2021
Start Time: 09:07:53.0

AVL
Concerto M.O.V.E, 2019

Trip Duration	1822.00	s
Trip Duration (a)	1822.00	s
Trip Distance	24.20	mi
Trip Distance (a)	24.20	mi
Trip Fuel Cons. (b)	2.79	kg
Trip Fuel Cons. (ab)	2.79	kg
Trip Fuel Cons. EU (ac)	2.68	kg
Trip Fuel Cons. US (ac)	2.66	kg
Trip Fuel Economy (b)	24.51	mpg_US
Trip Fuel Economy (ab)	24.51	mpg_US
Trip Fuel Economy EU (ac)	25.50	mpg_US
Trip Fuel Economy US (ac)	25.73	mpg_US
Trip Fuel Economy GGE (b)	24.51	mpg_US
Trip Fuel Economy GGE (ab)	24.51	mpg_US
Trip Fuel Economy EU GGE (ac)	25.50	mpg_US
Trip Fuel Economy US GGE (ac)	25.73	mpg_US
Trip Av. Eng. Speed	1717.26	rpm
Trip Av. Torque	84.15	lbft
Trip Av. Power	29.86	hp
Trip Work		
Trip Work (a)	15.11	hphr
Trip Exhaust Mass	41.12	kg
Trip Exhaust Mass EU (ac)	42.74	kg
Trip Exhaust Mass US (ac)	43.11	kg
Trip Av. Amb. Temperature	66.57	deg_F
Trip Av. Humidity	66.84	%
Trip Av. GPS Altitude	56.81	m
Fuel Type	Petrol (E10)	

ave THC	19.01622	ppm
ave NMHC	16.92137	ppm
ave CH4	2.09485	ppm
ave CO	129.25065	ppm
ave CO2	12.64264	%
ave NOx	17.93775	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	0.26827	g
tot NMHC	0.22555	g
tot CH4	0.04242	g
tot CO	6.21281	g
tot CO2	8094.76420	g
tot NO (d)	1.45298	g
tot NO2	0.05933	g
tot NOx	1.51226	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	47.80636	mi/hr
Trip Distance Share Urban	10.02645	% distance
Trip Distance Share Rural	6.56097	% distance
Trip Distance Share Motorway	83.41258	% distance

BS CO2	535.65804	g/hphr
BS CO	0.41112	g/hphr
BS THC	0.01775	g/hphr
BS NMHC	0.01493	g/hphr
BS CH4	0.00281	g/hphr
BS NO (d)	0.09615	g/hphr
BS NO2	0.00393	g/hphr
BS NOx	0.10007	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	334.55897	g/mi
DS CO	0.25678	g/mi
DS THC	0.01109	g/mi
DS NMHC	0.00932	g/mi
DS CH4	0.00175	g/mi
DS NO (d)	0.06005	g/mi
DS NO2	0.00245	g/mi
DS NOx	0.06250	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	2898.43043	g/kg
FS CO	2.22457	g/kg
FS THC	0.09606	g/kg
FS NMHC	0.08076	g/kg
FS CH4	0.01519	g/kg
FS NO (d)	0.52026	g/kg
FS NO2	0.02124	g/kg
FS NOx	0.54148	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

Case: L447-2128
Page: Trip Summary Drift Corrected

'A0 LATC>CARB'
Start Date: 05/13/2021
Start Time: 09:07:53.0

AVL
Concerto M.O.V.E, 2019

Trip Duration	1822.00	s
Trip Duration (a)	1822.00	s
Trip Distance	24.20	mi
Trip Distance (a)	24.20	mi
Trip Fuel Cons. (b)	2.79	kg
Trip Fuel Cons. (ab)	2.79	kg
Trip Fuel Cons. EU (ac)	2.68	kg
Trip Fuel Cons. US (ac)	2.66	kg
Trip Fuel Economy (b)	24.51	mpg_US
Trip Fuel Economy (ab)	24.51	mpg_US
Trip Fuel Economy EU (ac)	25.50	mpg_US
Trip Fuel Economy US (ac)	25.73	mpg_US
Trip Fuel Economy GGE (b)	24.51	mpg_US
Trip Fuel Economy GGE (ab)	24.51	mpg_US
Trip Fuel Economy EU GGE (ac)	25.50	mpg_US
Trip Fuel Economy US GGE (ac)	25.73	mpg_US
Trip Av. Eng. Speed	1717.26	rpm
Trip Av. Torque	84.15	lbft
Trip Av. Power	29.86	hp
Trip Work		
Trip Work (a)	15.11	hphr
Trip Exhaust Mass	41.12	kg
Trip Exhaust Mass EU (ac)	42.74	kg
Trip Exhaust Mass US (ac)	43.11	kg
Trip Av. Amb. Temperature	66.57	deg_F
Trip Av. Humidity	66.84	%
Trip Av. GPS Altitude	56.81	m
Fuel Type	Petrol (E10)	

ave THC DC	19.09441	ppm
ave NMHC DC	16.92875	ppm
ave CH4 DC	2.16566	ppm
ave CO DC	129.34605	ppm
ave CO2 DC	12.63269	%
ave NOx DC	17.94511	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	0.26928	g
tot NMHC DC	0.22566	g
tot CH4 DC	0.04298	g
tot CO DC	6.21740	g
tot CO2 DC	8088.38870	g
tot NO DC (d)	1.45357	g
tot NO2 DC	0.05936	g
tot NOx DC	1.51288	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	47.80636	mi/hr
Trip Distance Share Urban	10.02645	% distance
Trip Distance Share Rural	6.56097	% distance
Trip Distance Share Motorway	83.41258	% distance

BS CO2 DC	535.23616	g/hphr
BS CO DC	0.41143	g/hphr
BS THC DC	0.01782	g/hphr
BS NMHC DC	0.01493	g/hphr
BS CH4 DC	0.00284	g/hphr
BS NO DC (d)	0.09619	g/hphr
BS NO2 DC	0.00393	g/hphr
BS NOx DC	0.10011	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	334.29547	g/mi
DS CO DC	0.25697	g/mi
DS THC DC	0.01113	g/mi
DS NMHC DC	0.00933	g/mi
DS CH4 DC	0.00178	g/mi
DS NO DC (d)	0.06008	g/mi
DS NO2 DC	0.00245	g/mi
DS NOx DC	0.06253	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	2896.14760	g/kg
FS CO DC	2.22622	g/kg
FS THC DC	0.09642	g/kg
FS NMHC DC	0.08080	g/kg
FS CH4 DC	0.01539	g/kg
FS NO DC (d)	0.52047	g/kg
FS NO2 DC	0.02125	g/kg
FS NOx DC	0.54171	g/kg
FS Soot	n/a	g/kg
FS Soot meas	n/a	g/kg
FS PM	n/a	g/kg
FS PN DC		

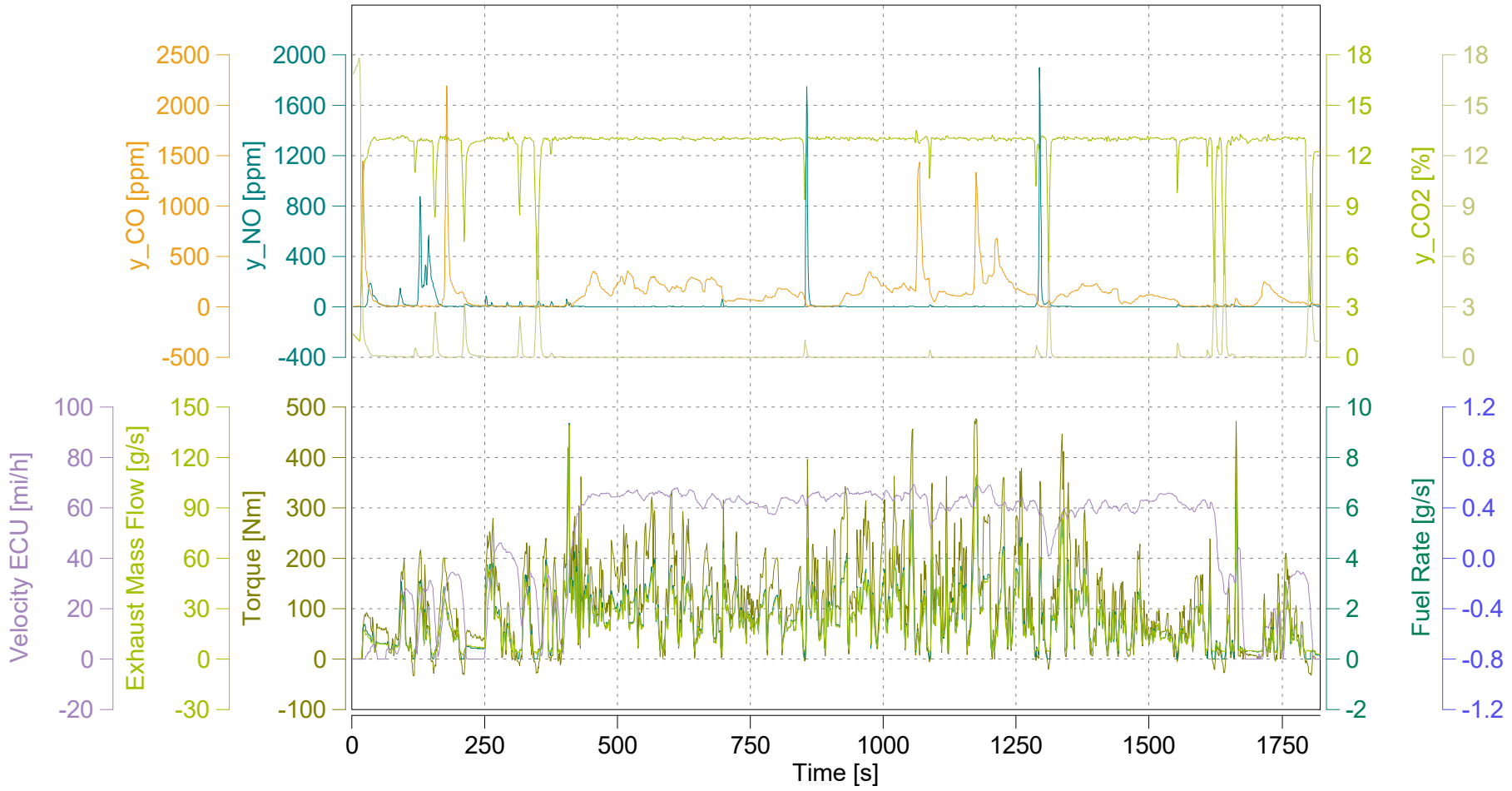
(a) GAS PEMS measurement state only, (b) based on fuel rate input (ECU, Fuel Meter), (c) Based on A/F ratio (eq 28-32 - R49)
(d) NO calculated using molecular weight of NO2, GGE=Gasoline Gallon Equivalents

Case: L447-2128
Page: Time Alignment Check

'A0 LATC>CARB'
Start Date: 05/13/2021
Start Time: 09:07:53.0

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 Plo

Reset Time

Reset Al

Apply Curr

Concerto Version: 504 Build 119, Serial Number: 1604
M.O.V.E Post-Processing: DT_1R4.1_B340
Legislation:

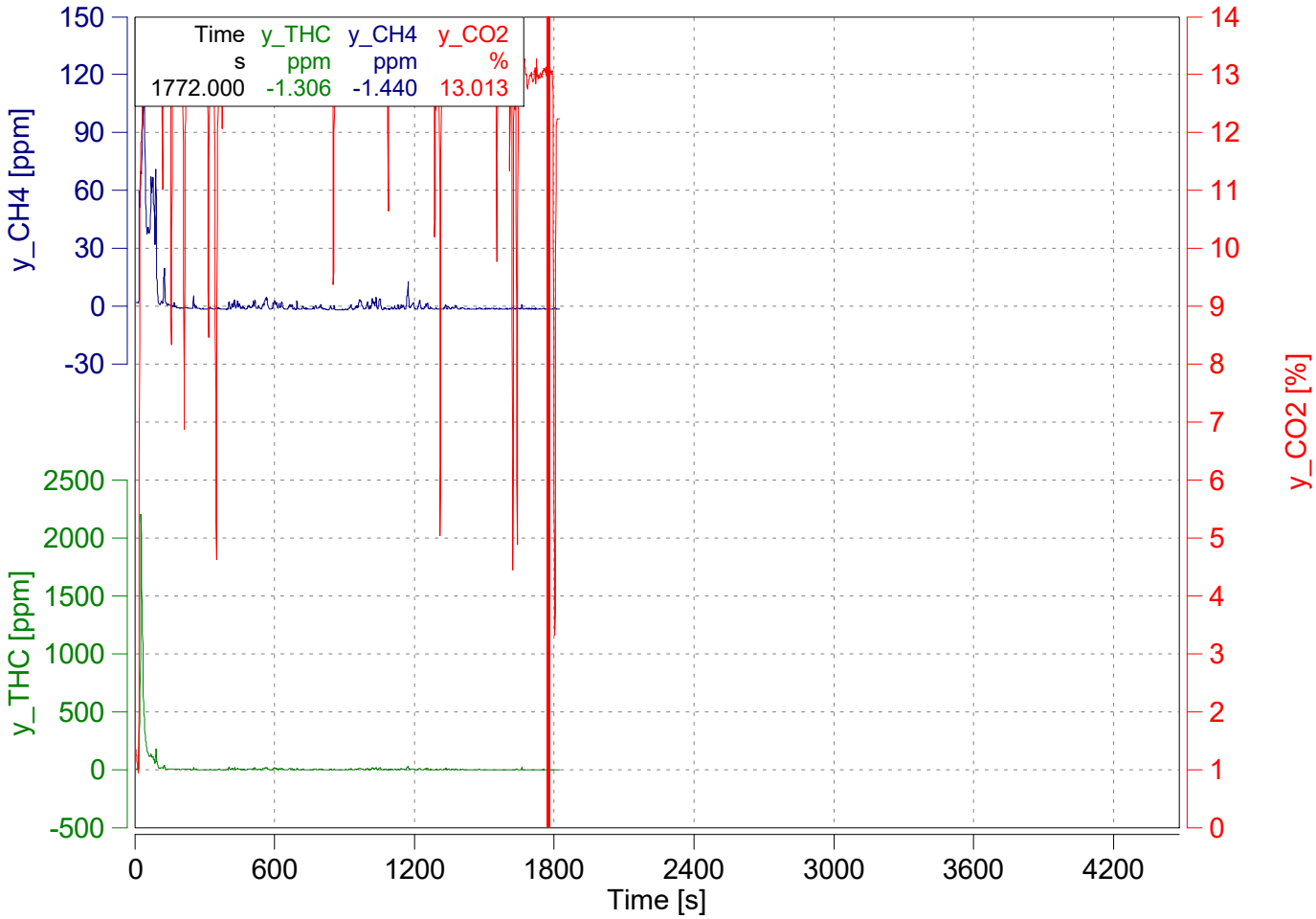
Vehicle: L447-2128 /
Engine: /
NOx Ambient Condition Corr.: 7 - CFR40 §1065.670
Dry / Wet Corr.: 2 - CFR40 §86.1342-90

Case: L447-2128
Page: Time Alignment of Gas Concentrations

'A0 LATC>CARB'
Start Date: 05/13/2021
Start Time: 09:07:53.0

AVL

Concerto M.O.V.E, 2019



Absolute Time Shifts

y_THC	s	-5.2
y_CH4	s	-7.2

Reset Time Shifts in Plot

Apply Current Values

Concerto Version: 504 Build 119, Serial Number: 1604
M.O.V.E Post-Processing: DT_1R4.1_B340
Legislation:

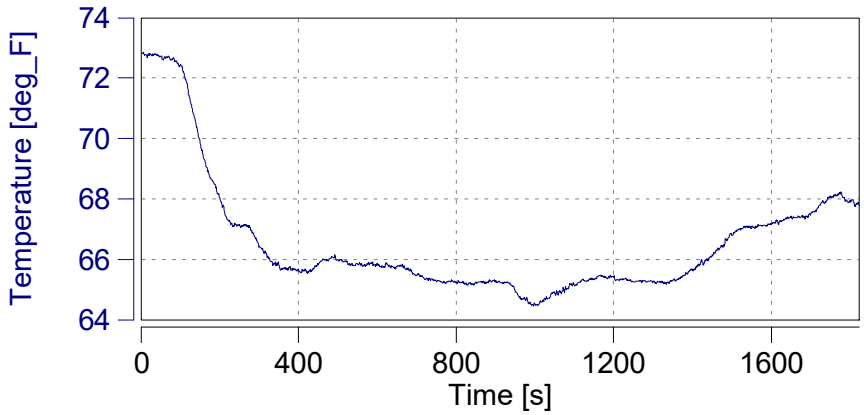
Vehicle: L447-2128 /
Engine: /
NOx Ambient Condition Corr.: 7 - CFR40 §1065.670
Dry / Wet Corr.: 2 - CFR40 §86.1342-90

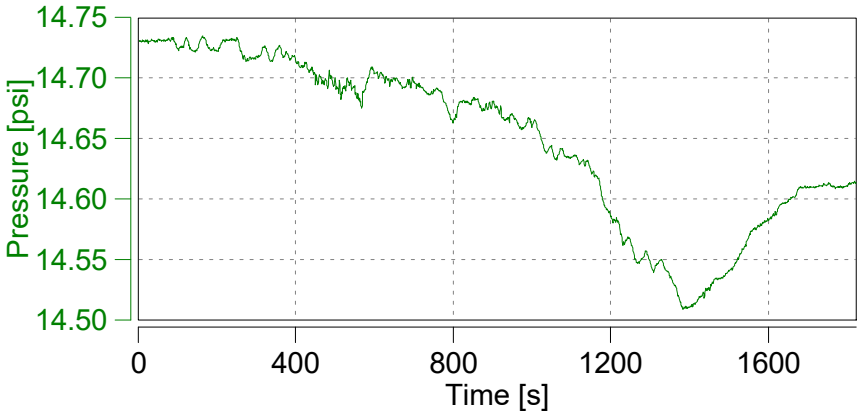
Case: L447-2128
Page: Ambient Conditions

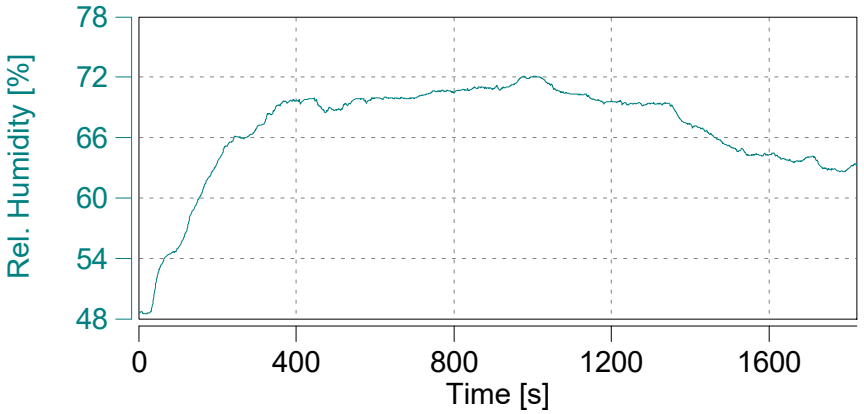
'A0 LATC>CARB'
Start Date: 05/13/2021
Start Time: 09:07:53.0

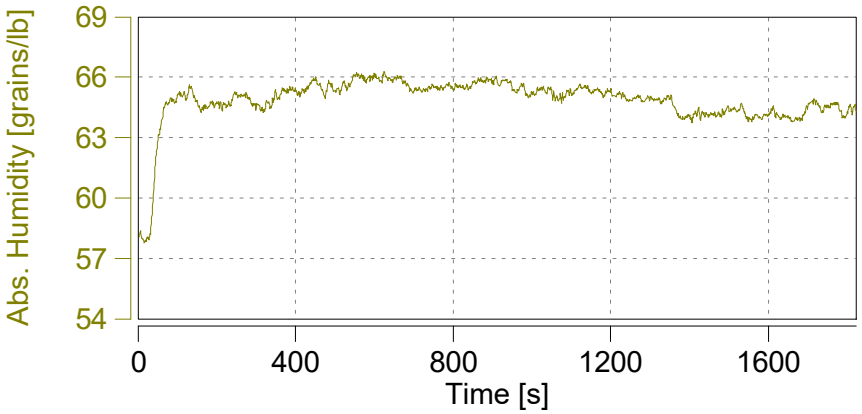
AVL

Concerto M.O.V.E, 2019







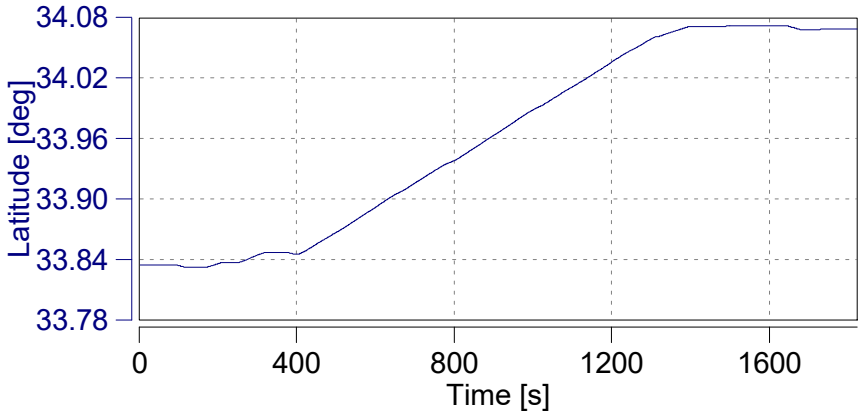


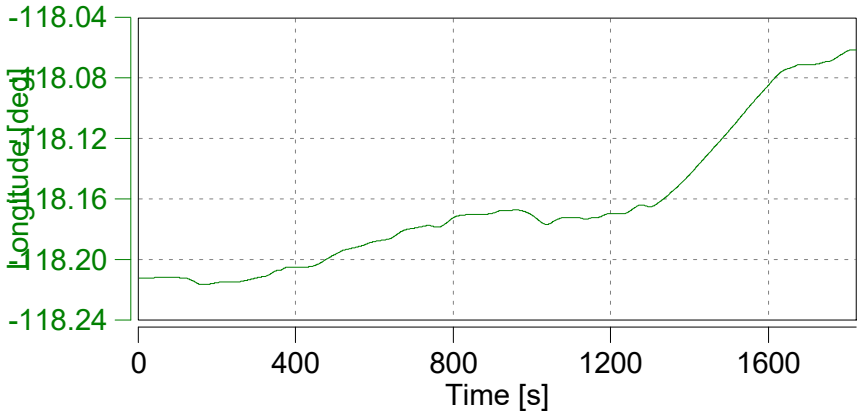
Concerto Version: 504 Build 119, Serial Number: 1604
M.O.V.E Post-Processing: DT_1R4.1_B340
Legislation:

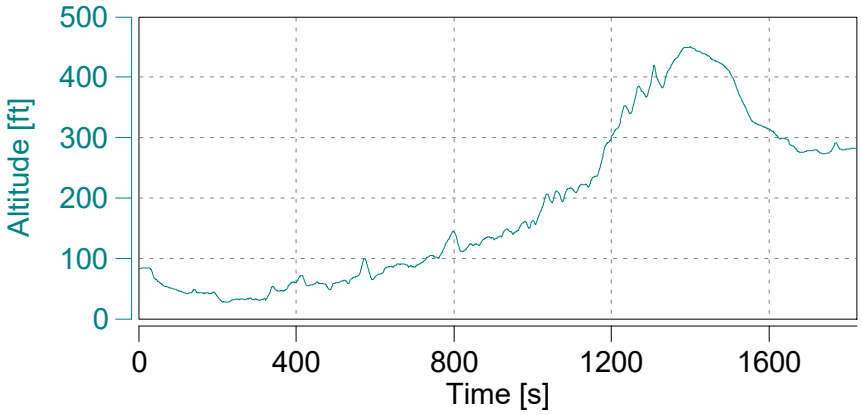
Vehicle: L447-2128 /
Engine: /
NOx Ambient Condition Corr.: 7 - CFR40 §1065.670
Dry / Wet Corr.: 2 - CFR40 §86.1342-90

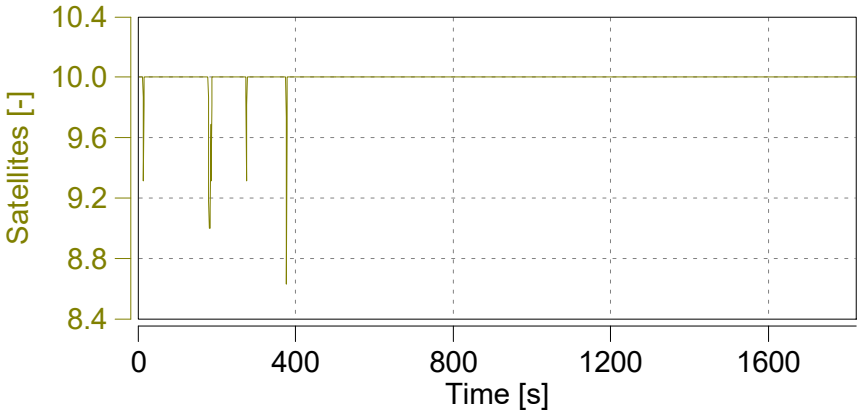
'A0 LATC>CARB'
Start Date: 05/13/2021
Start Time: 09:07:53.0

Concerto M.O.V.E, 2019









Concerto Version: 504 Build 119, Serial Number: 1604
M.O.V.E Post-Processing: DT_1R4.1_B340
Legislation:

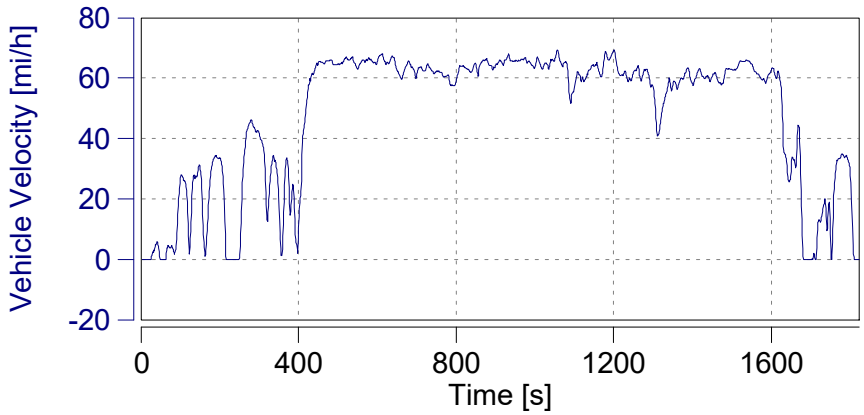
Vehicle: L447-2128 /
Engine: /
NOx Ambient Condition Corr.: 7 - CFR40 §1065.670
Dry / Wet Corr.: 2 - CFR40 §86.1342-90

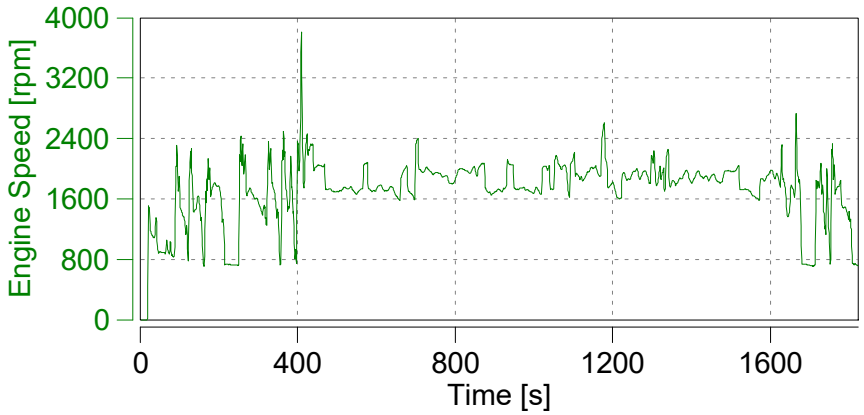
Case: L447-2128
Page: Engine (1)

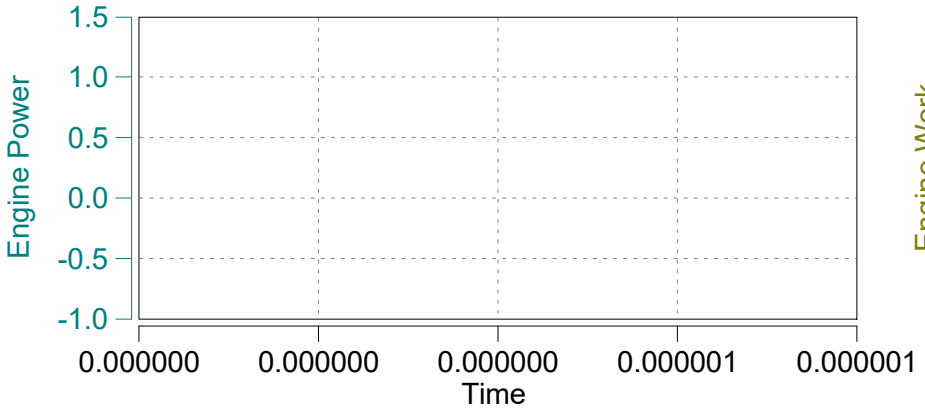
'A0 LATC>CARB'
Start Date: 05/13/2021
Start Time: 09:07:53.0

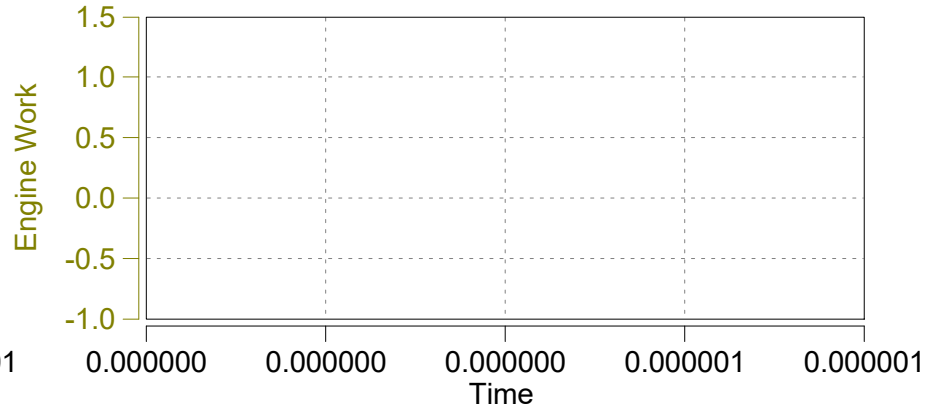
AVL

Concerto M.O.V.E, 2019









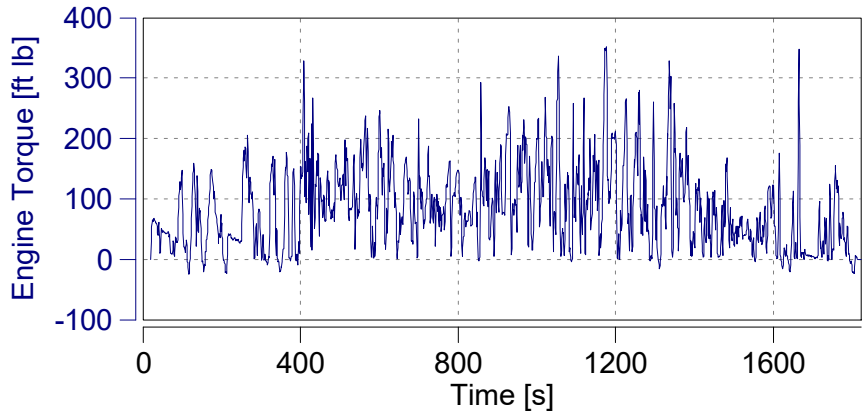
Concerto Version: 504 Build 119, Serial Number: 1604
M.O.V.E Post-Processing: DT_1R4.1_B340
Legislation:

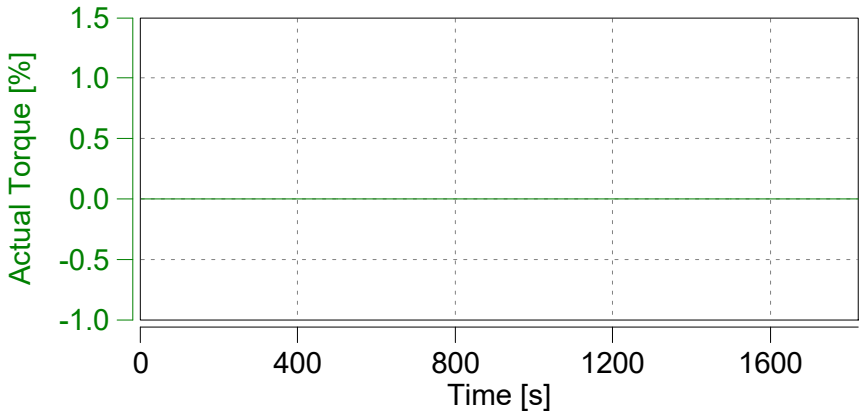
Vehicle: L447-2128 /
Engine: /
NOx Ambient Condition Corr.: 7 - CFR40 §1065.670
Dry / Wet Corr.: 2 - CFR40 §86.1342-90

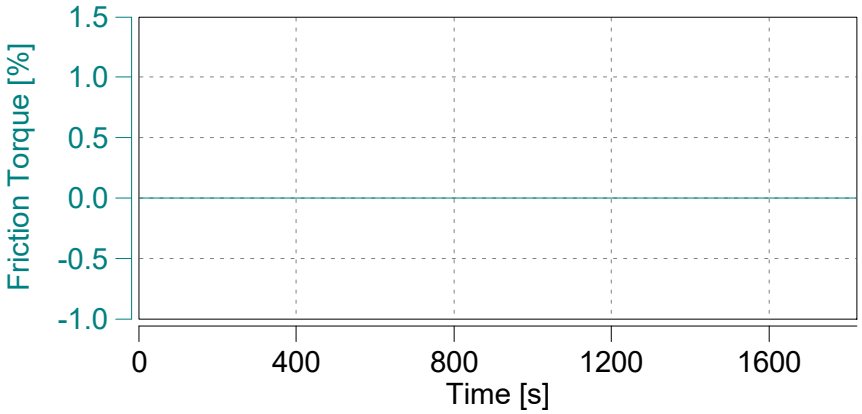
'A0 LATC>CARB'
Start Date: 05/13/2021
Start Time: 09:07:53.0

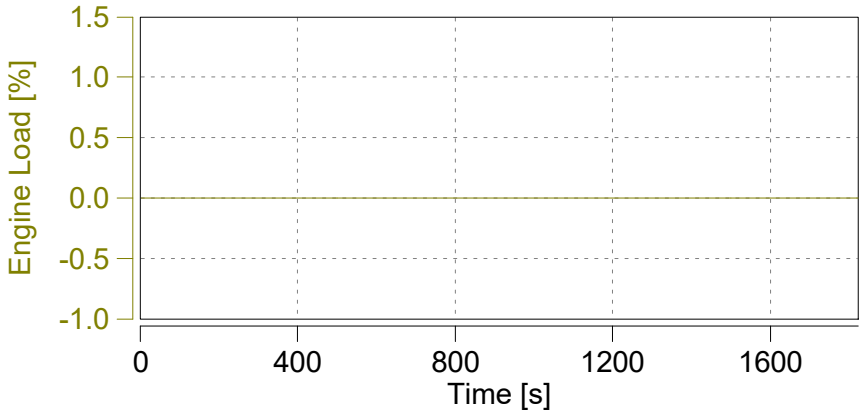
AVL

Concerto M.O.V.E, 2019



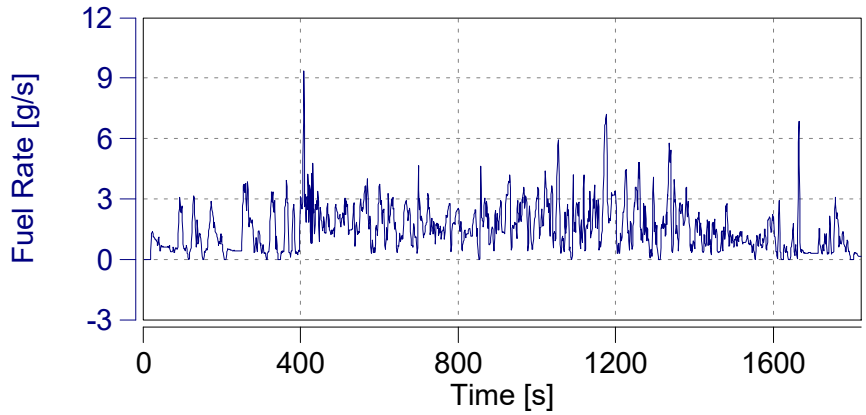


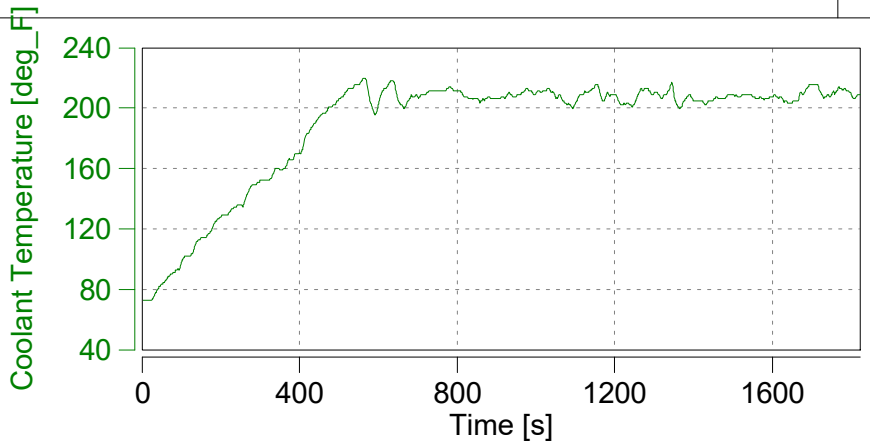


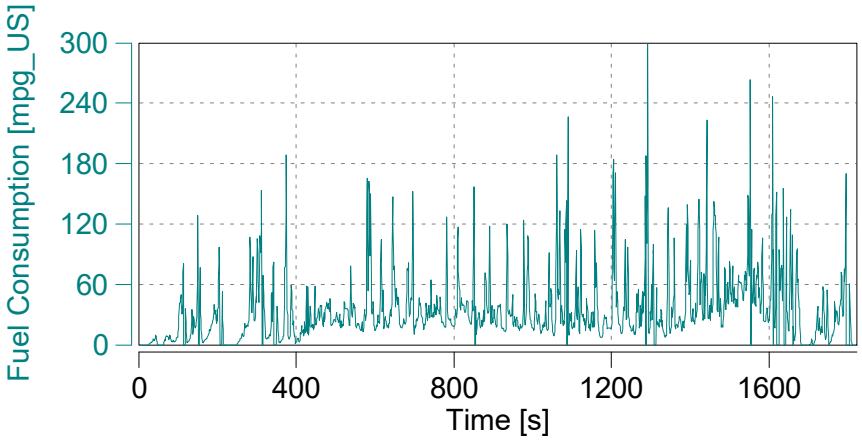


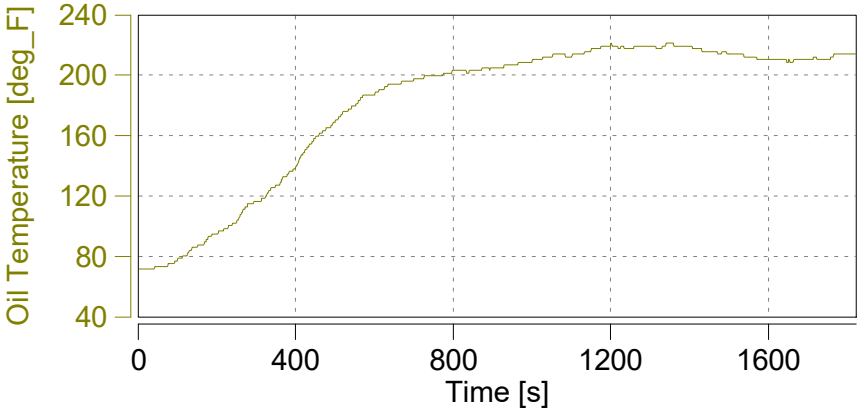
Concerto Version: 504 Build 119, Serial Number: 1604
M.O.V.E Post-Processing: DT_1R4.1_B340
Legislation:

Vehicle: L447-2128 /
Engine: /
NOx Ambient Condition Corr.: 7 - CFR40 §1065.670
Dry / Wet Corr.: 2 - CFR40 §86.1342-90


Fuel Rate [g/s]
12
9
6
3
0
-3
0
400
800
1200
1600
Time [s]


Coolant Temperature [deg_F]
240
200
160
120
80
40
0
400
800
1200
1600
Time [s]

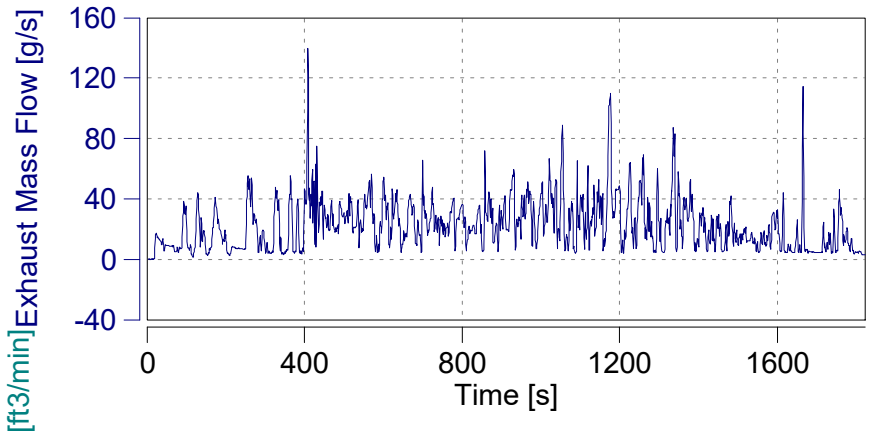

Fuel Consumption [mpg_US]
300
240
180
120
60
0
0
400
800
1200
1600
Time [s]

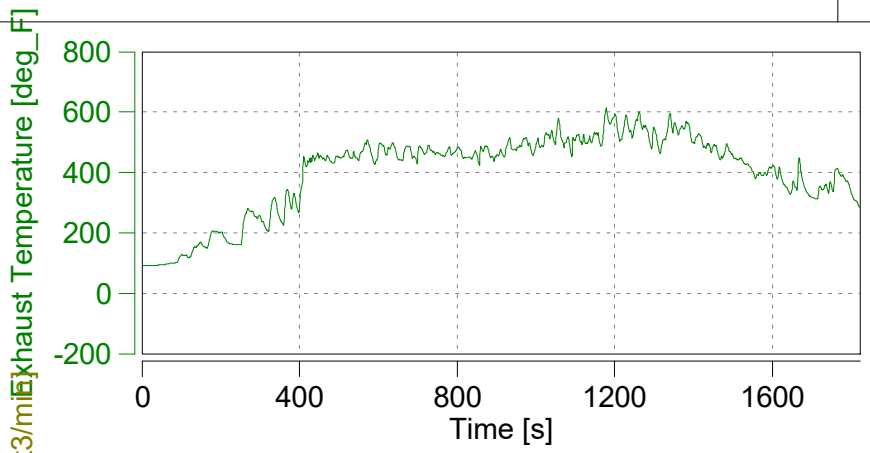

Oil Temperature [deg_F]
240
200
160
120
80
40
0
400
800
1200
1600
Time [s]

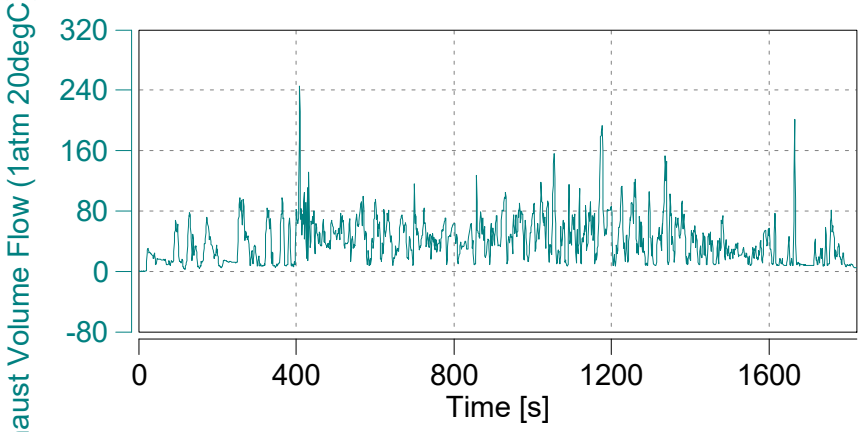
Case: L447-2128
Page: Exhaust Flow (1)

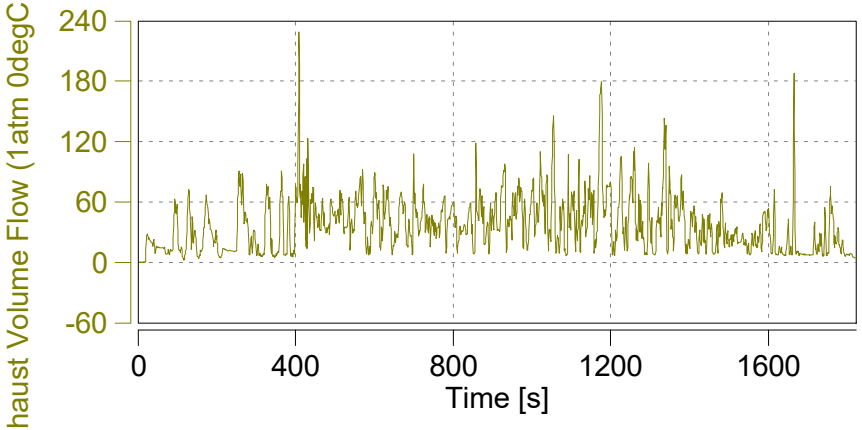
'A0 LATC>CARB'
Start Date: 05/13/2021
Start Time: 09:07:53.0

AVL
Concerto M.O.V.E, 2019









Concerto Version: 504 Build 119, Serial Number: 1604
M.O.V.E Post-Processing: DT_1R4.1_B340
Legislation:

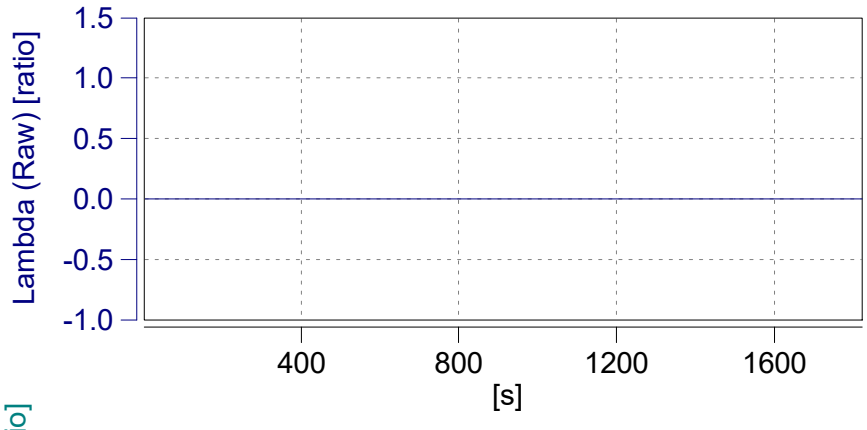
Vehicle: L447-2128 /
Engine: /
NOx Ambient Condition Corr.: 7 - CFR40 §1065.670
Dry / Wet Corr.: 2 - CFR40 §86.1342-90

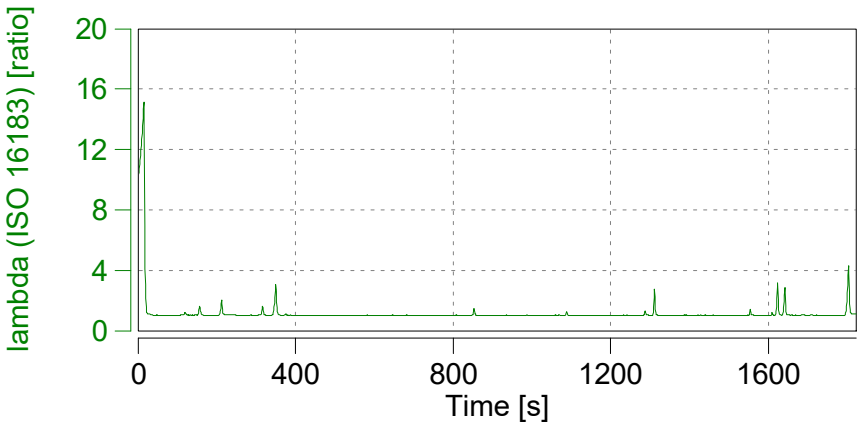
Case: L447-2128
Page: Exhaust Flow (2)

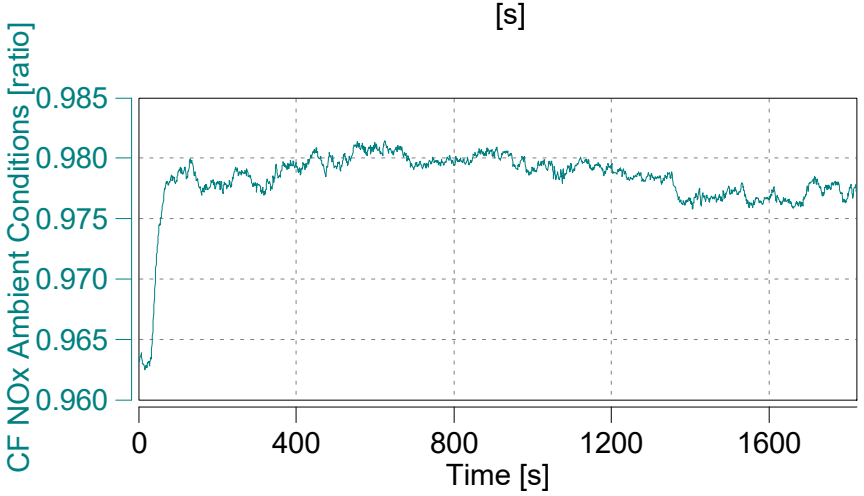
'A0 LATC>CARB'
Start Date: 05/13/2021
Start Time: 09:07:53.0

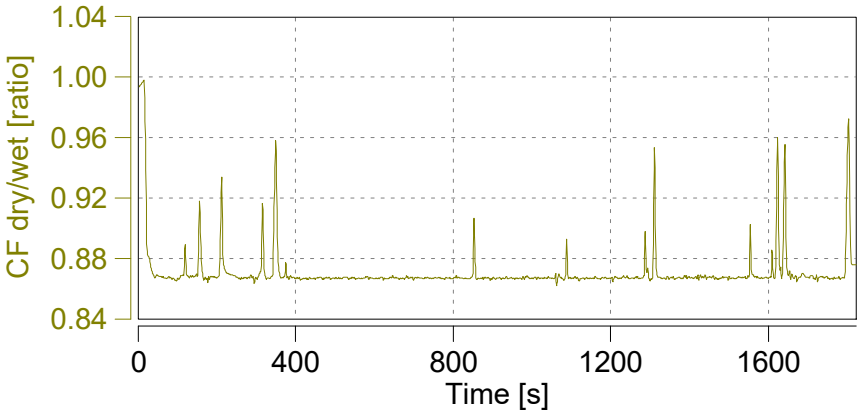
AVL

Concerto M.O.V.E, 2019









Concerto Version: 504 Build 119, Serial Number: 1604
M.O.V.E Post-Processing: DT_1R4.1_B340
Legislation:

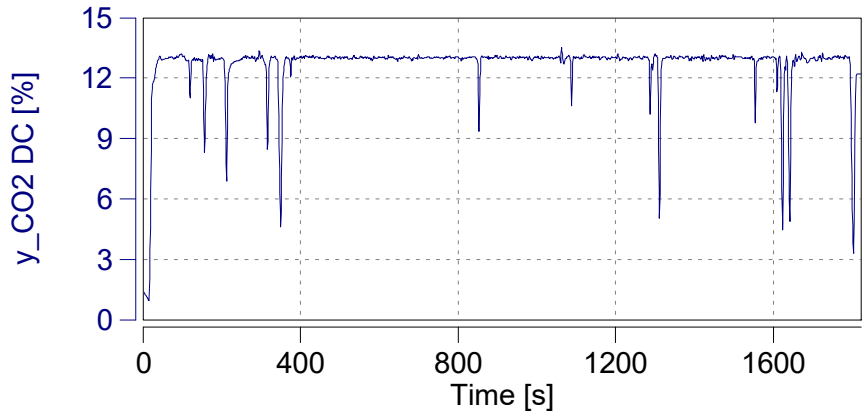
Vehicle: L447-2128 /
Engine: /
NOx Ambient Condition Corr.: 7 - CFR40 §1065.670
Dry / Wet Corr.: 2 - CFR40 §86.1342-90

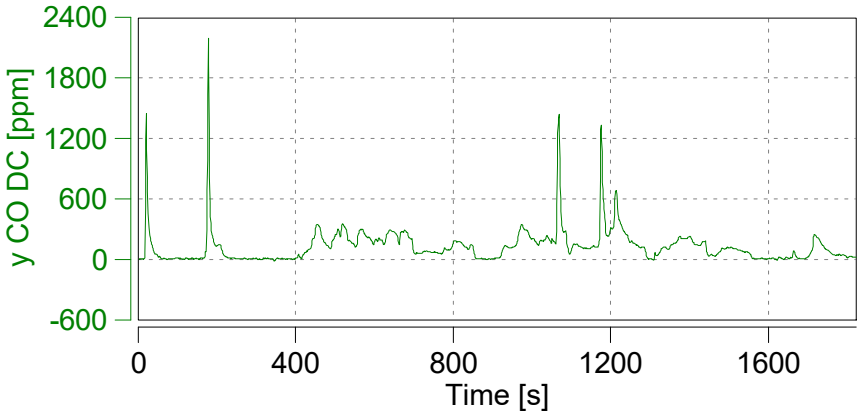
Case: L447-2128
Page: Corrected Emissions (1)

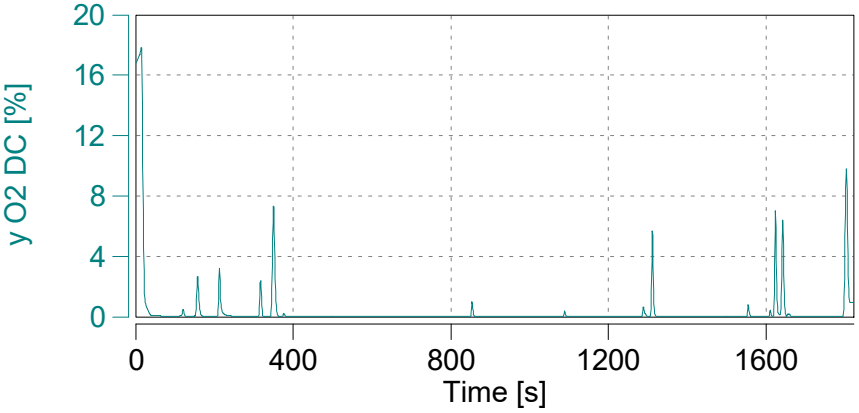
'A0 LATC>CARB'
Start Date: 05/13/2021
Start Time: 09:07:53.0

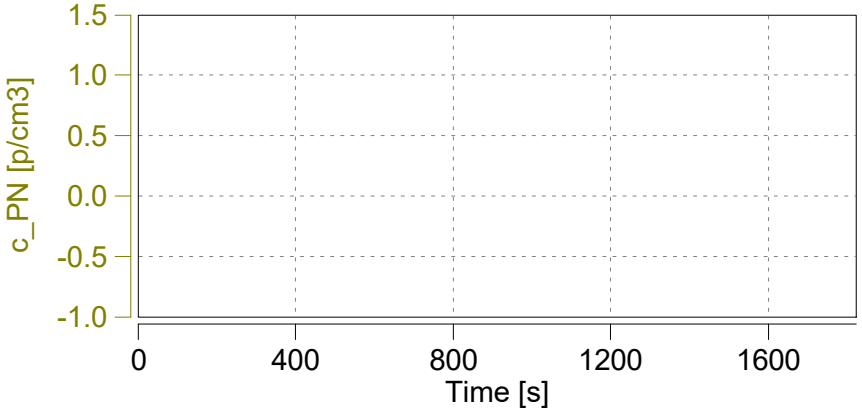
AVL

Concerto M.O.V.E, 2019









Concerto Version: 504 Build 119, Serial Number: 1604
M.O.V.E Post-Processing: DT_1R4.1_B340
Legislation:

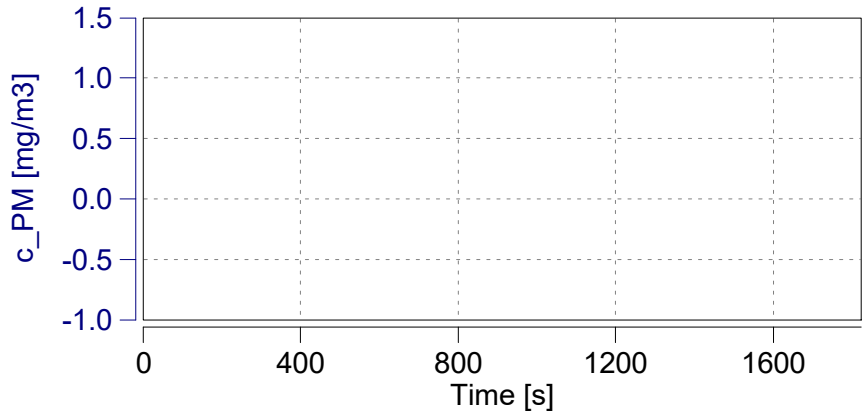
Vehicle: L447-2128 /
Engine: /
NOx Ambient Condition Corr.: 7 - CFR40 §1065.670
Dry / Wet Corr.: 2 - CFR40 §86.1342-90

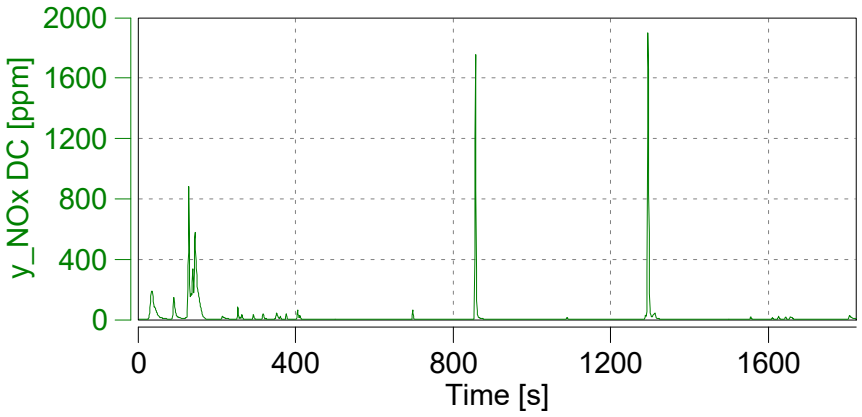
Case: L447-2128
Page: Corrected Emissions (2)

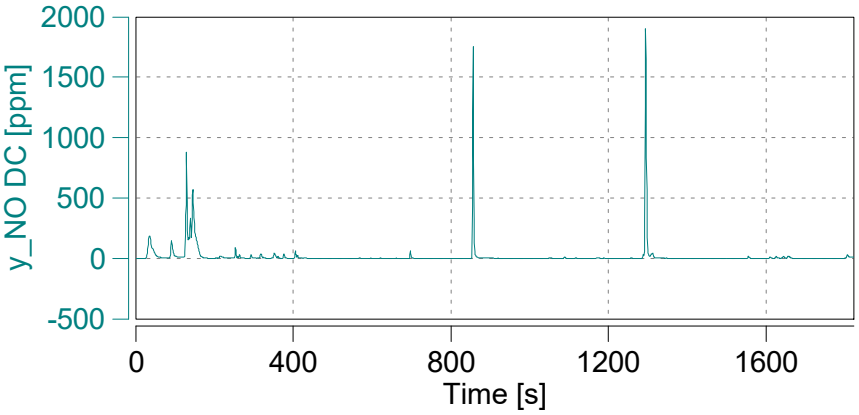
'A0 LATC>CARB'
Start Date: 05/13/2021
Start Time: 09:07:53.0

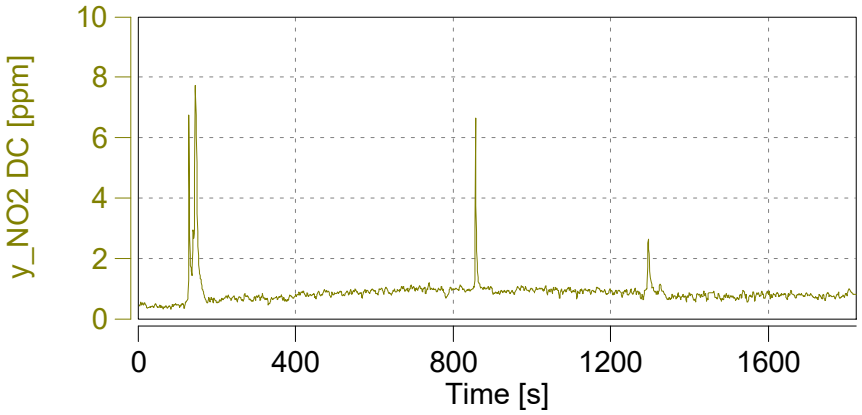
AVL

Concerto M.O.V.E, 2019









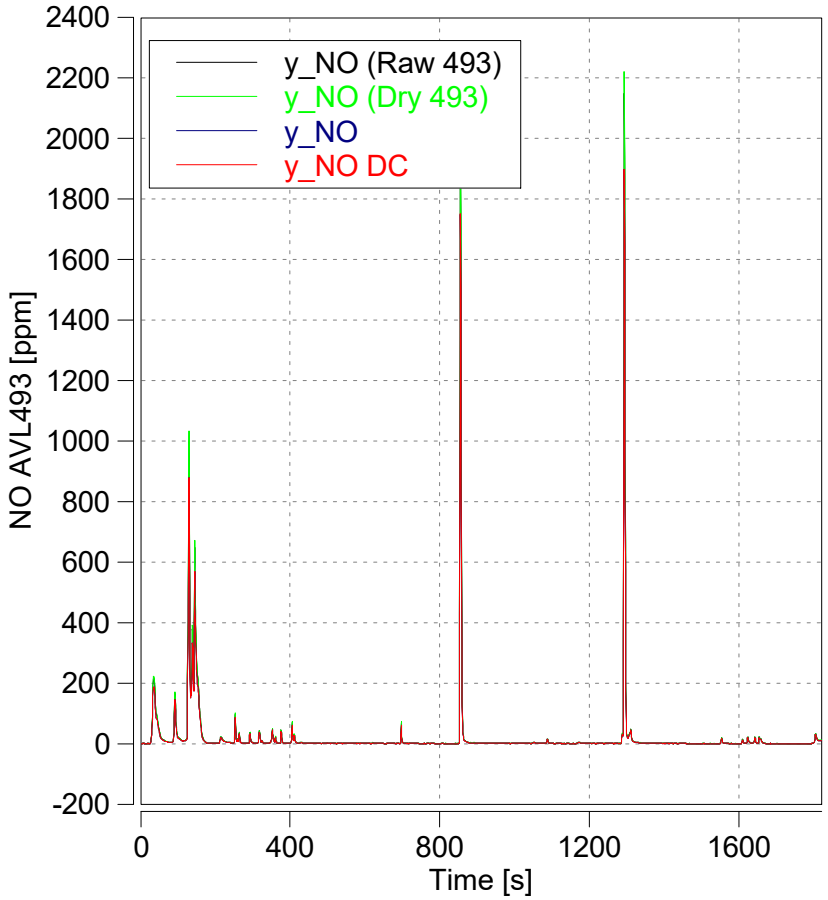
Concerto Version: 504 Build 119, Serial Number: 1604
M.O.V.E Post-Processing: DT_1R4.1_B340
Legislation:

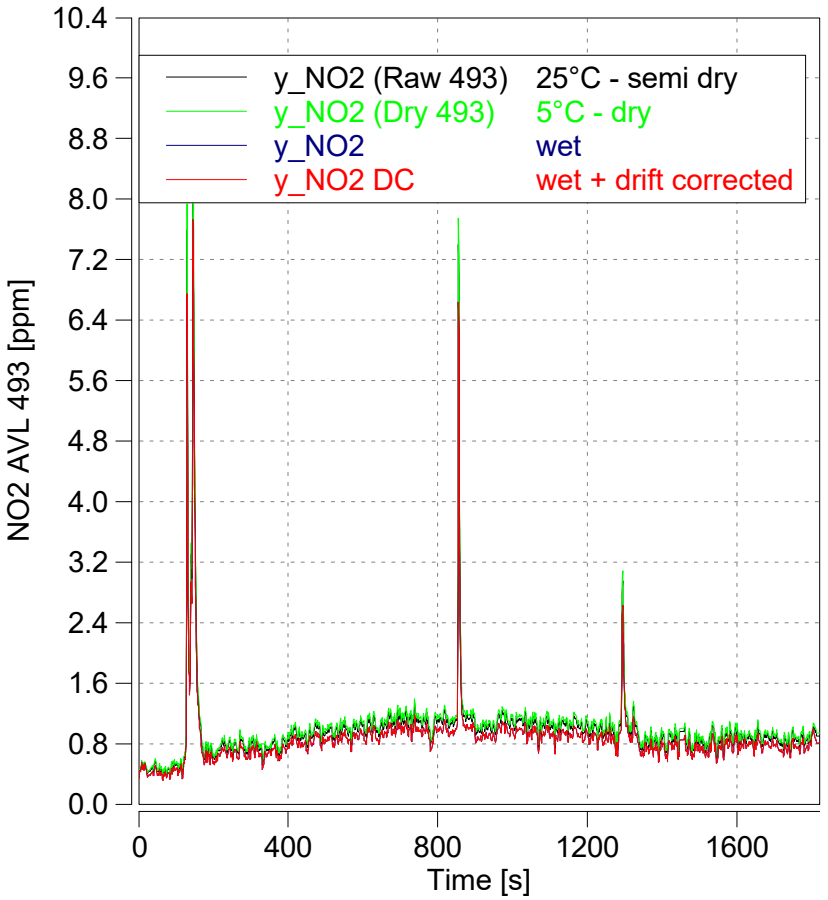
Vehicle: L447-2128 /
Engine: /
NOx Ambient Condition Corr.: 7 - CFR40 §1065.670
Dry / Wet Corr.: 2 - CFR40 §86.1342-90

Case: L447-2128
Page: Corrected Emissions (3)

'A0 LATC>CARB'
Start Date: 05/13/2021
Start Time: 09:07:53.0

AVL
Concerto M.O.V.E, 2019

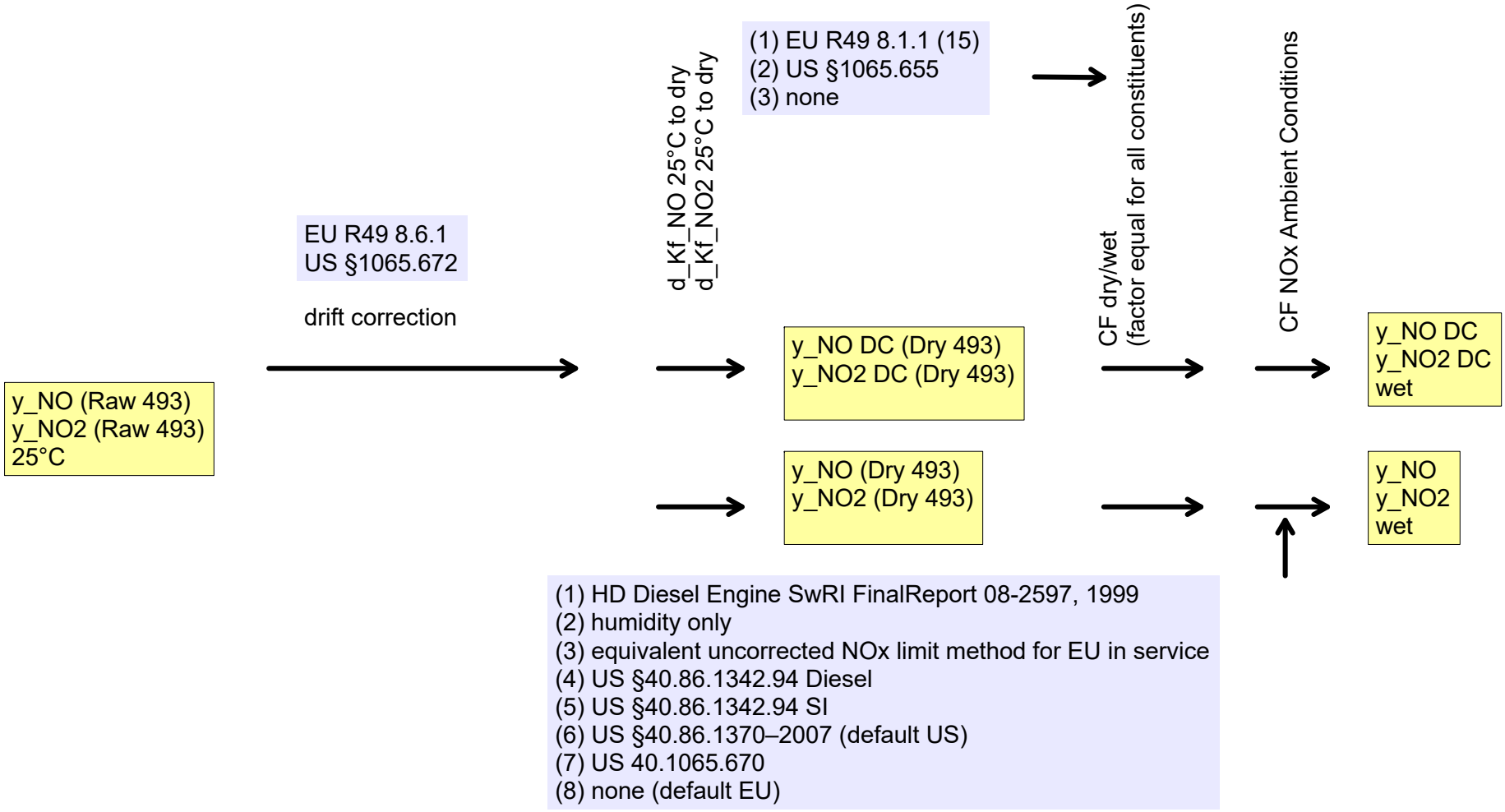


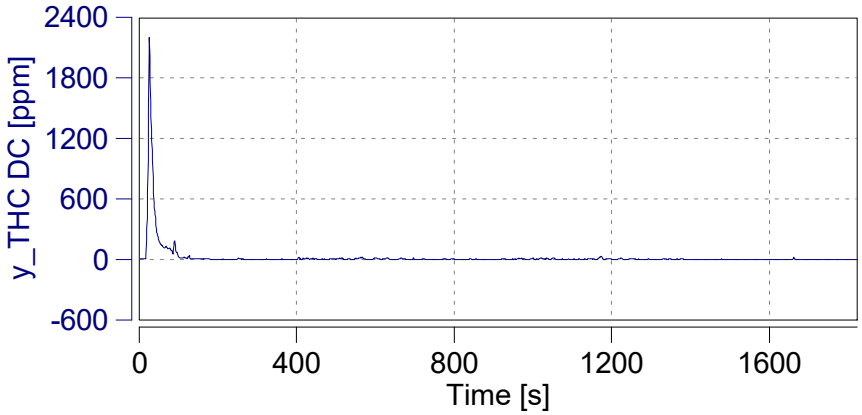


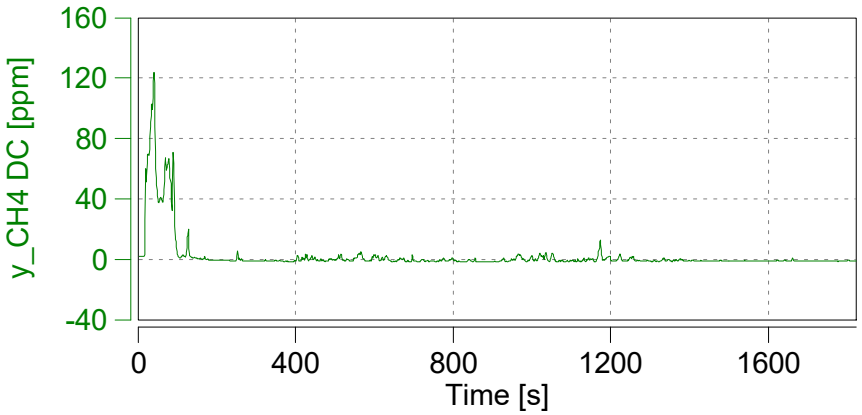
Concerto Version: 504 Build 119, Serial Number: 1604
M.O.V.E Post-Processing: DT_1R4.1_B340
Legislation:

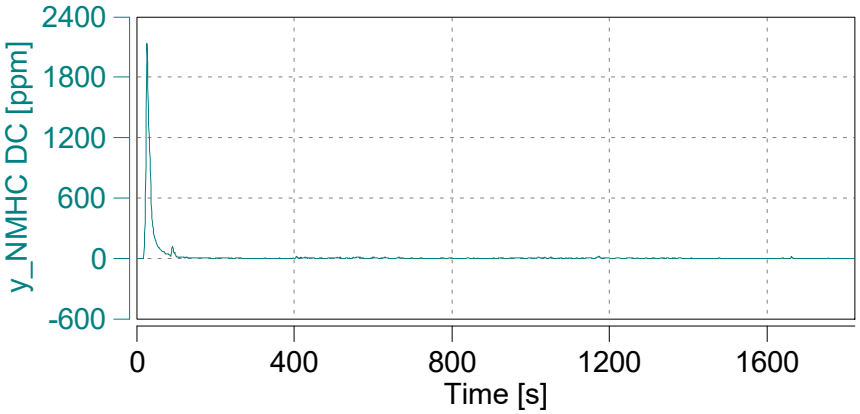
Vehicle: L447-2128 /
Engine: /
NOx Ambient Condition Corr.: 7 - CFR40 §1065.670
Dry / Wet Corr.: 2 - CFR40 §86.1342-90

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)


y_THC DC [ppm]
2400
1800
1200
600
0
-600
0
400
800
1200
1600
Time [s]

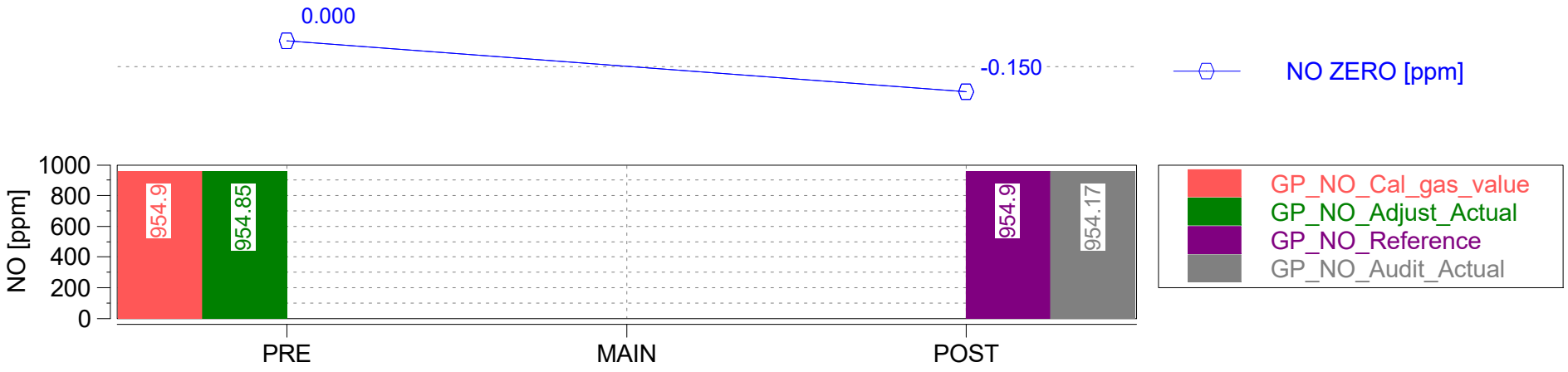

y_CH4 DC [ppm]
160
120
80
40
0
-40
0
400
800
1200
1600
Time [s]

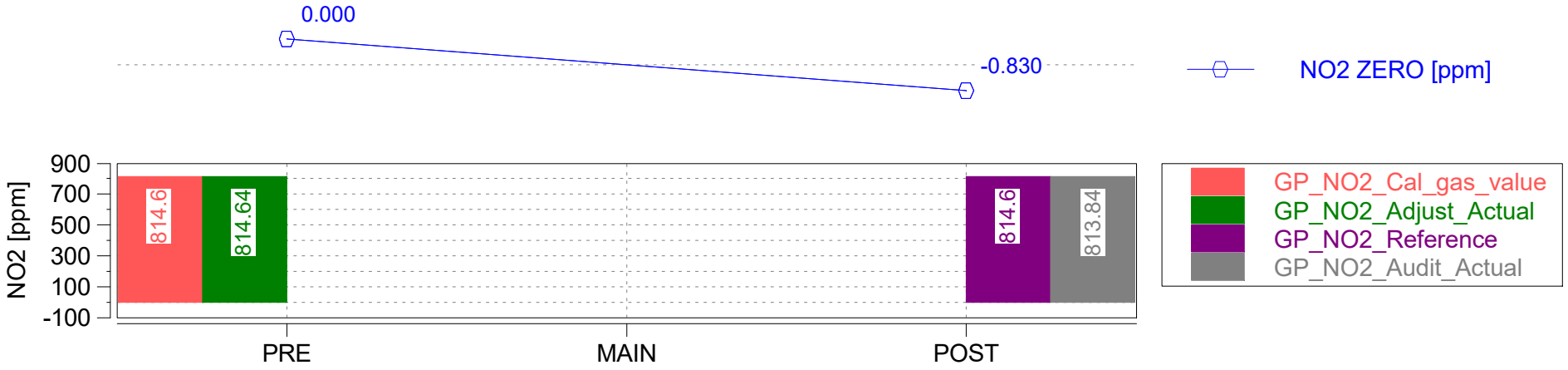

y_NMHC DC [ppm]
2400
1800
1200
600
0
-600
0
400
800
1200
1600
Time [s]

Case: L447-2128
Page: NO/NO2/NOx Zero - Span

'A0 LATC>CARB'
Start Date: 05/13/2021
Start Time: 09:07:53.0

AVL
Concerto M.O.V.E, 2019





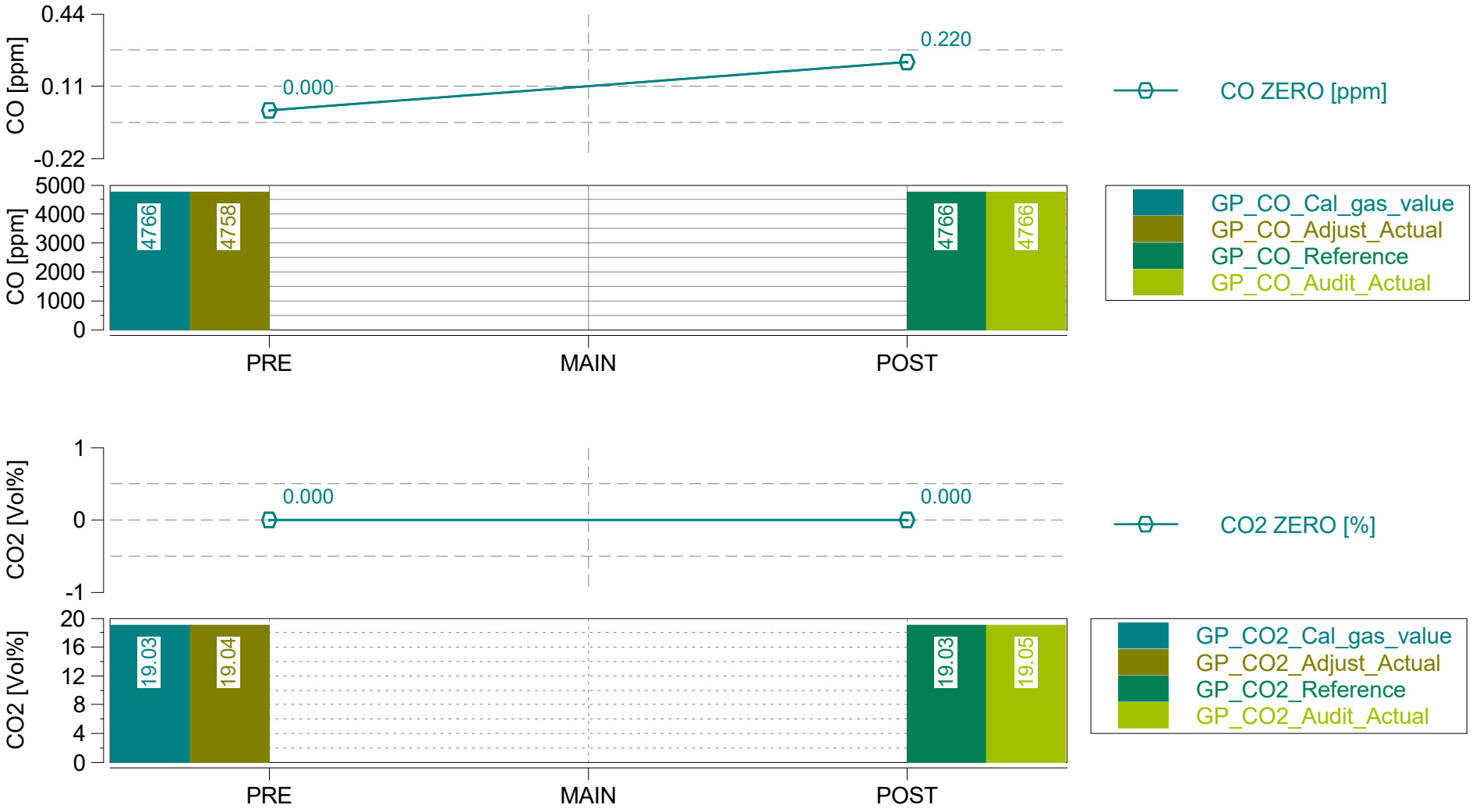
Concerto Version: 504 Build 119, Serial Number: 1604
M.O.V.E Post-Processing: DT_1R4.1_B340
Legislation:

Vehicle: L447-2128 /
Engine: /
NOx Ambient Condition Corr.: 7 - CFR40 §1065.670
Dry / Wet Corr.: 2 - CFR40 §86.1342-90

Case: L447-2128
Page: CO/CO2 Zero - Span

'A0 LATC>CARB'
Start Date: 05/13/2021
Start Time: 09:07:53.0

AVL
Concerto M.O.V.E, 2019



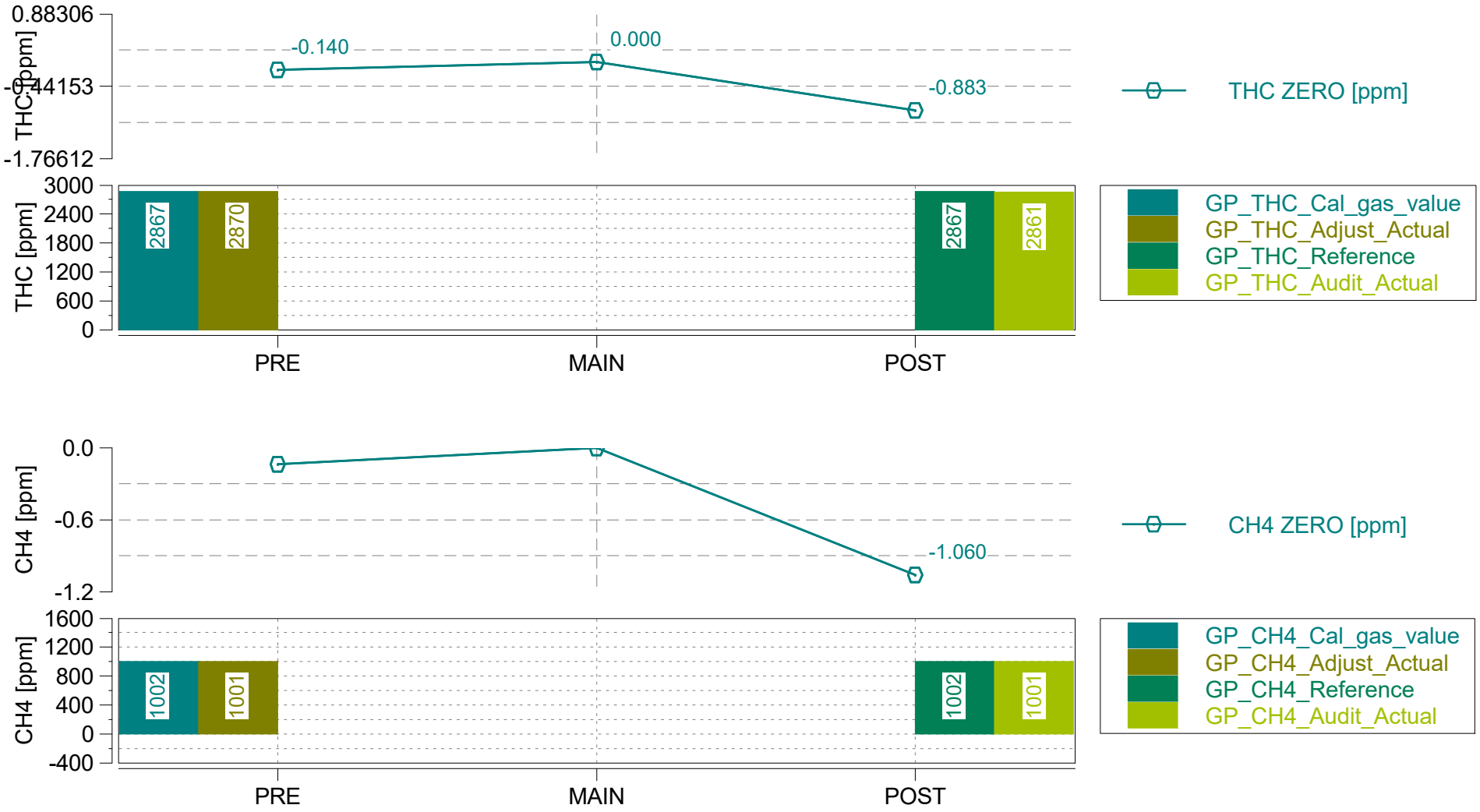
Concerto Version: 504 Build 119, Serial Number: 1604
M.O.V.E Post-Processing: DT_1R4.1_B340
Legislation:

Vehicle: L447-2128 /
Engine: /
NOx Ambient Condition Corr.: 7 - CFR40 §1065.670
Dry / Wet Corr.: 2 - CFR40 §86.1342-90

Case: L447-2128
Page: THC/CH4 Zero - Span

'A0 LATC>CARB'
Start Date: 05/13/2021
Start Time: 09:07:53.0

AVL
Concerto M.O.V.E, 2019



Concerto Version: 504 Build 119, Serial Number: 1604
M.O.V.E Post-Processing: DT_1R4.1_B340
Legislation:

Vehicle: L447-2128 /
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%	**0.07**	**%**	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	0597
Firmware Version	V1.16
Main Test Date	2021-05-13
Leak Check Age [days]	0

Device ID	AVL4925
Serial Number	175
Firmware Version	1.20.0.8

EFM

Device ID	AVL495
Serial Number	00915
Serial Number Tube	01115
Firmware Version	V1.13

System Control

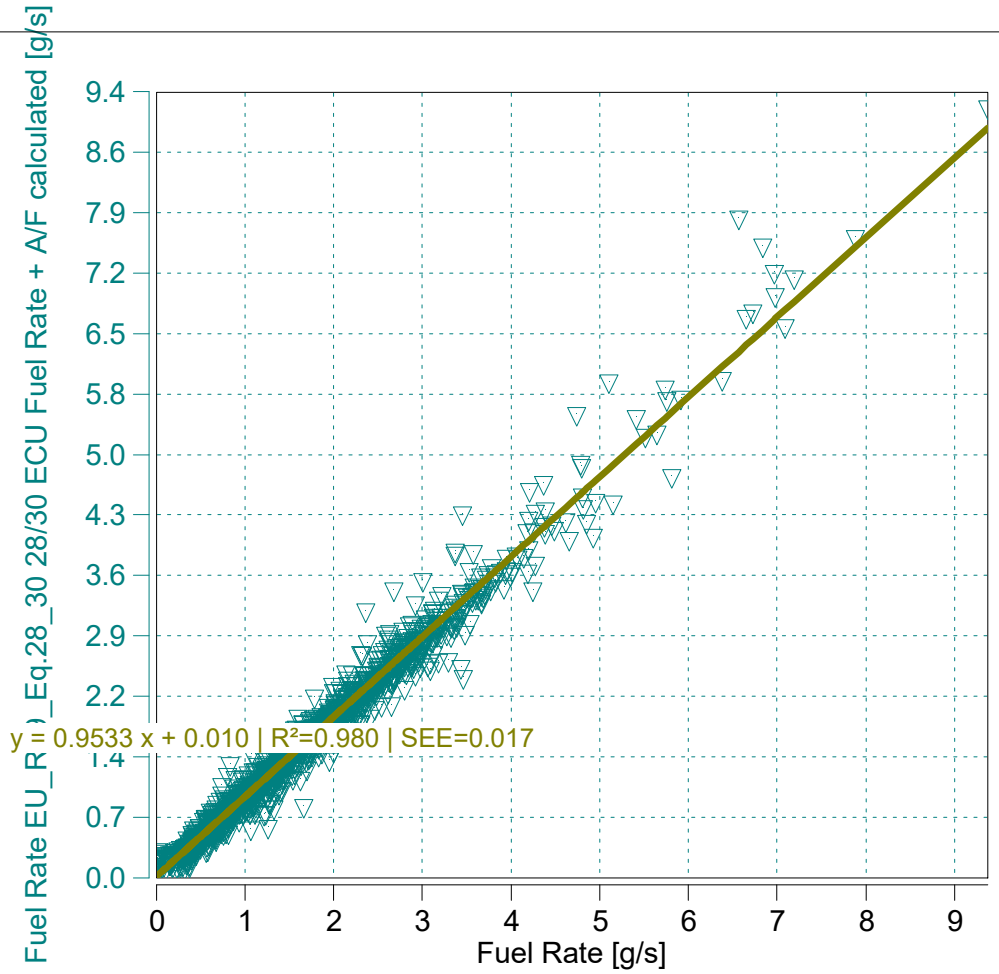
SC Version	V2.6_212
SC Serial Number	60300923

Case: L447-2128
Page: Fuel Rate ECU vs. Calculated

'A0 LATC>CARB'
Start Date: 05/13/2021
Start Time: 09:07:53.0

AVL

Concerto M.O.V.E, 2019



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

y = 0.9533 x + 0.010 | R²=0.980 | SEE=0.017
m = 0.95 (0.9 - 1.1 recommended)
R² = 0.98 (min 0.9 mandatory)

Data from - to [% of Maximum]

0 100

Concerto Version: 504 Build 119, Serial Number: 1604
M.O.V.E Post-Processing: DT_1R4.1_B340
Legislation:

Vehicle: L447-2128 /
Engine: /
NOx Ambient Condition Corr.: 7 - CFR40 §1065.670
Dry / Wet Corr.: 2 - CFR40 §86.1342-90

ase: L447-2128
age: Trip Summary

'LA City Route (Default)'
Start Date: 05/12/2021
Start Time: 10:50:28.0

AVL
Concerto M.O.V.E, 2019

Duration	3282.00	s
Duration (a)	3282.00	s
Distance	15.91	mi
Distance (a)	15.91	mi
Fuel Cons. (b)	2.94	kg
Fuel Cons. (ab)	2.94	kg
Fuel Cons. EU (ac)	2.90	kg
Fuel Cons. US (ac)	2.88	kg
Fuel Economy (b)	15.29	mpg_US
Fuel Economy (ab)	15.29	mpg_US
Fuel Economy EU (ac)	15.52	mpg_US
Fuel Economy US (ac)	15.65	mpg_US
Fuel Economy GGE (b)	15.29	mpg_US
Fuel Economy GGE (ab)	15.29	mpg_US
Fuel Economy EU GGE (ac)	15.52	mpg_US
Fuel Economy US GGE (ac)	15.65	mpg_US
Av. Eng. Speed	1376.14	rpm
Av. Torque	42.41	lbft
Av. Power	15.11	hp
Work		
Work (a)	13.78	hphr
Exhaust Mass	44.85	kg
Exhaust Mass EU (ac)	45.31	kg
Exhaust Mass US (ac)	45.73	kg
Av. Amb. Temperature	80.12	deg_F
Av. Humidity	43.64	%
Av. GPS Altitude	70.98	m
el Type	Petrol (E10)	

ave THC	-1.15917	ppm
ave NMHC	0.90498	ppm
ave CH4	-2.06415	ppm
ave CO	27.76973	ppm
ave CO2	12.51852	%
ave NOx	3.56255	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	0.01729	g
tot NMHC	0.03150	g
tot CH4	0.00158	g
tot CO	1.59406	g
tot CO2	8748.65050	g
tot NO (d)	0.13876	g
tot NO2	0.00912	g
tot NOx	0.14637	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	17.45299	mi/hr
Trip Distance Share Urban	76.73810	% distance
Trip Distance Share Rural	9.85066	% distance
Trip Distance Share Motorway	13.41123	% distance

BS CO2	635.08371	g/hphr
BS CO	0.11572	g/hphr
BS THC	0.00126	g/hphr
BS NMHC	0.00229	g/hphr
BS CH4	0.00011	g/hphr
BS NO (d)	0.01007	g/hphr
BS NO2	0.00066	g/hphr
BS NOx	0.01063	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	549.83848	g/mi
DS CO	0.10018	g/mi
DS THC	0.00109	g/mi
DS NMHC	0.00198	g/mi
DS CH4	0.00010	g/mi
DS NO (d)	0.00872	g/mi
DS NO2	0.00057	g/mi
DS NOx	0.00920	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	2971.21638	g/kg
FS CO	0.54138	g/kg
FS THC	0.00587	g/kg
FS NMHC	0.01070	g/kg
FS CH4	0.00054	g/kg
FS NO (d)	0.04713	g/kg
FS NO2	0.00310	g/kg
FS NOx	0.04971	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

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

ncerto Version: 504 Build 119, Serial Number: 1604
O.V.E Post-Processing: DT_1R4.1_B340
islation:

Vehicle: L447-2128 /
Engine: /
NOx Ambient Condition Corr.: 7 - CFR40 §1065.670
Dry / Wet Corr.: 2 - CFR40 §86.1342-90

ase: L447-2128
age: Trip Summary Drift Corrected

'LA City Route (Default)'
Start Date: 05/12/2021
Start Time: 10:50:28.0

AVL
Concerto M.O.V.E, 2019

Duration	3282.00	s
Duration (a)	3282.00	s
Distance	15.91	mi
Distance (a)	15.91	mi
Fuel Cons. (b)	2.94	kg
Fuel Cons. (ab)	2.94	kg
Fuel Cons. EU (ac)	2.90	kg
Fuel Cons. US (ac)	2.88	kg
Fuel Economy (b)	15.29	mpg_US
Fuel Economy (ab)	15.29	mpg_US
Fuel Economy EU (ac)	15.52	mpg_US
Fuel Economy US (ac)	15.65	mpg_US
Fuel Economy GGE (b)	15.29	mpg_US
Fuel Economy GGE (ab)	15.29	mpg_US
Fuel Economy EU GGE (ac)	15.52	mpg_US
Fuel Economy US GGE (ac)	15.65	mpg_US
Av. Eng. Speed	1376.14	rpm
Av. Torque	42.41	lbft
Av. Power	15.11	hp
Work		
Work (a)	13.78	hphr
Exhaust Mass	44.85	kg
Exhaust Mass EU (ac)	45.31	kg
Exhaust Mass US (ac)	45.73	kg
Av. Amb. Temperature	80.12	deg_F
Av. Humidity	43.64	%
Av. GPS Altitude	70.98	m
el Type	Petrol (E10)	

ave THC DC	-1.06612	ppm
ave NMHC DC	0.92031	ppm
ave CH4 DC	-1.98643	ppm
ave CO DC	27.86224	ppm
ave CO2 DC	12.52181	%
ave NOx DC	3.56355	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	0.01777	g
tot NMHC DC	0.03183	g
tot CH4 DC	0.00165	g
tot CO DC	1.59937	g
tot CO2 DC	8750.94975	g
tot NO DC (d)	0.13880	g
tot NO2 DC	0.00912	g
tot NOx DC	0.14641	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	17.45299	mi/hr
Trip Distance Share Urban	76.73810	% distance
Trip Distance Share Rural	9.85066	% distance
Trip Distance Share Motorway	13.41123	% distance

BS CO2 DC	635.25062	g/hphr
BS CO DC	0.11610	g/hphr
BS THC DC	0.00129	g/hphr
BS NMHC DC	0.00231	g/hphr
BS CH4 DC	0.00012	g/hphr
BS NO DC (d)	0.01008	g/hphr
BS NO2 DC	0.00066	g/hphr
BS NOx DC	0.01063	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	549.98298	g/mi
DS CO DC	0.10052	g/mi
DS THC DC	0.00112	g/mi
DS NMHC DC	0.00200	g/mi
DS CH4 DC	0.00010	g/mi
DS NO DC (d)	0.00872	g/mi
DS NO2 DC	0.00057	g/mi
DS NOx DC	0.00920	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	2971.99726	g/kg
FS CO DC	0.54318	g/kg
FS THC DC	0.00603	g/kg
FS NMHC DC	0.01081	g/kg
FS CH4 DC	0.00056	g/kg
FS NO DC (d)	0.04714	g/kg
FS NO2 DC	0.00310	g/kg
FS NOx DC	0.04973	g/kg
FS Soot	n/a	g/kg
FS Soot meas	n/a	g/kg
FS PM	n/a	g/kg
FS PN DC		

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

ncerto Version: 504 Build 119, Serial Number: 1604
O.V.E Post-Processing: DT_1R4.1_B340
islation:

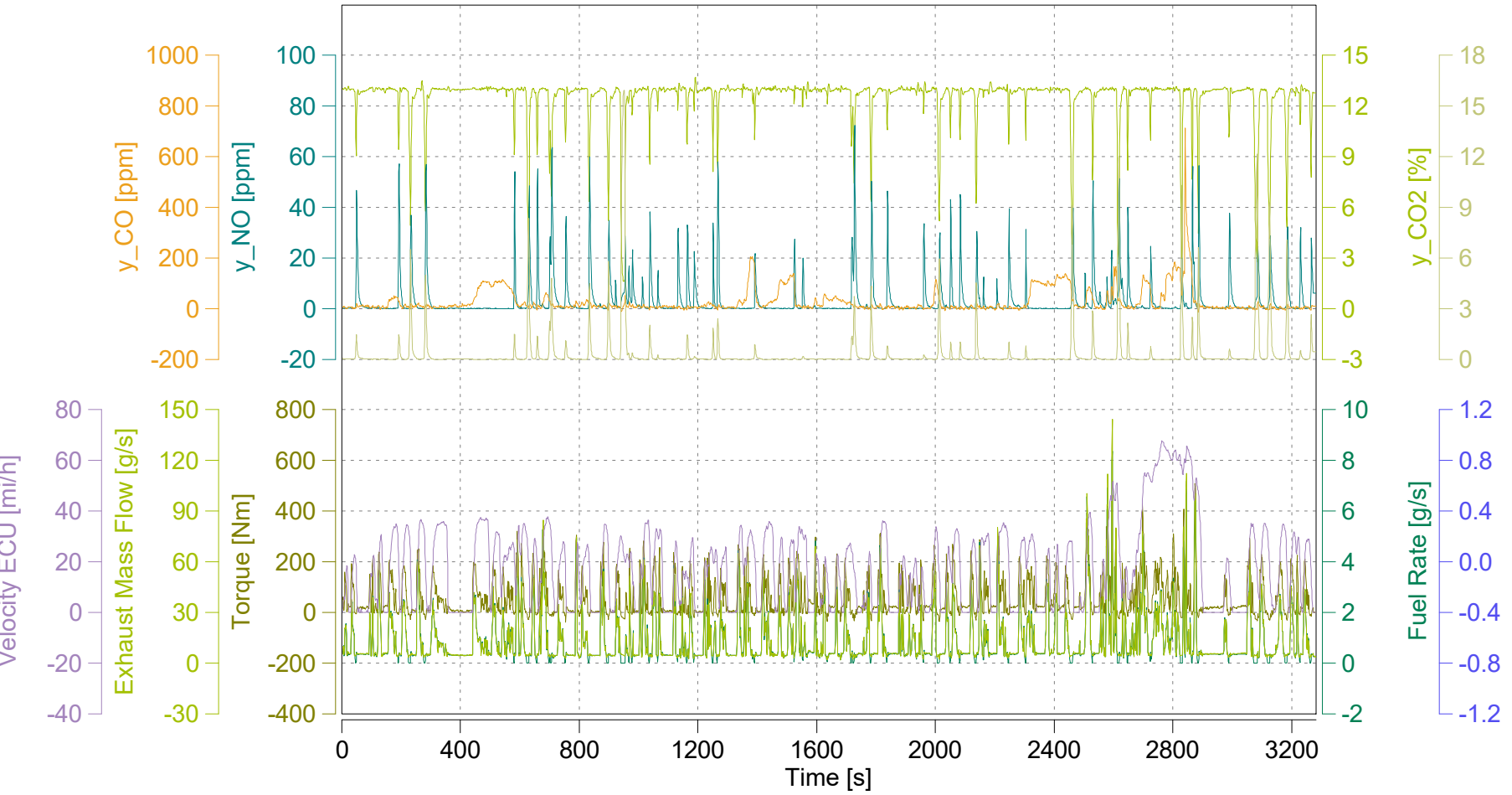
Vehicle: L447-2128 /
Engine: /
NOx Ambient Condition Corr.: 7 - CFR40 §1065.670
Dry / Wet Corr.: 2 - CFR40 §86.1342-90

ase: L447-2128
age: Time Alignment Check

'LA City Route (Default)'
Start Date: 05/12/2021
Start Time: 10:50:28.0

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 Plo

Reset Time

Reset Al

Apply Curr

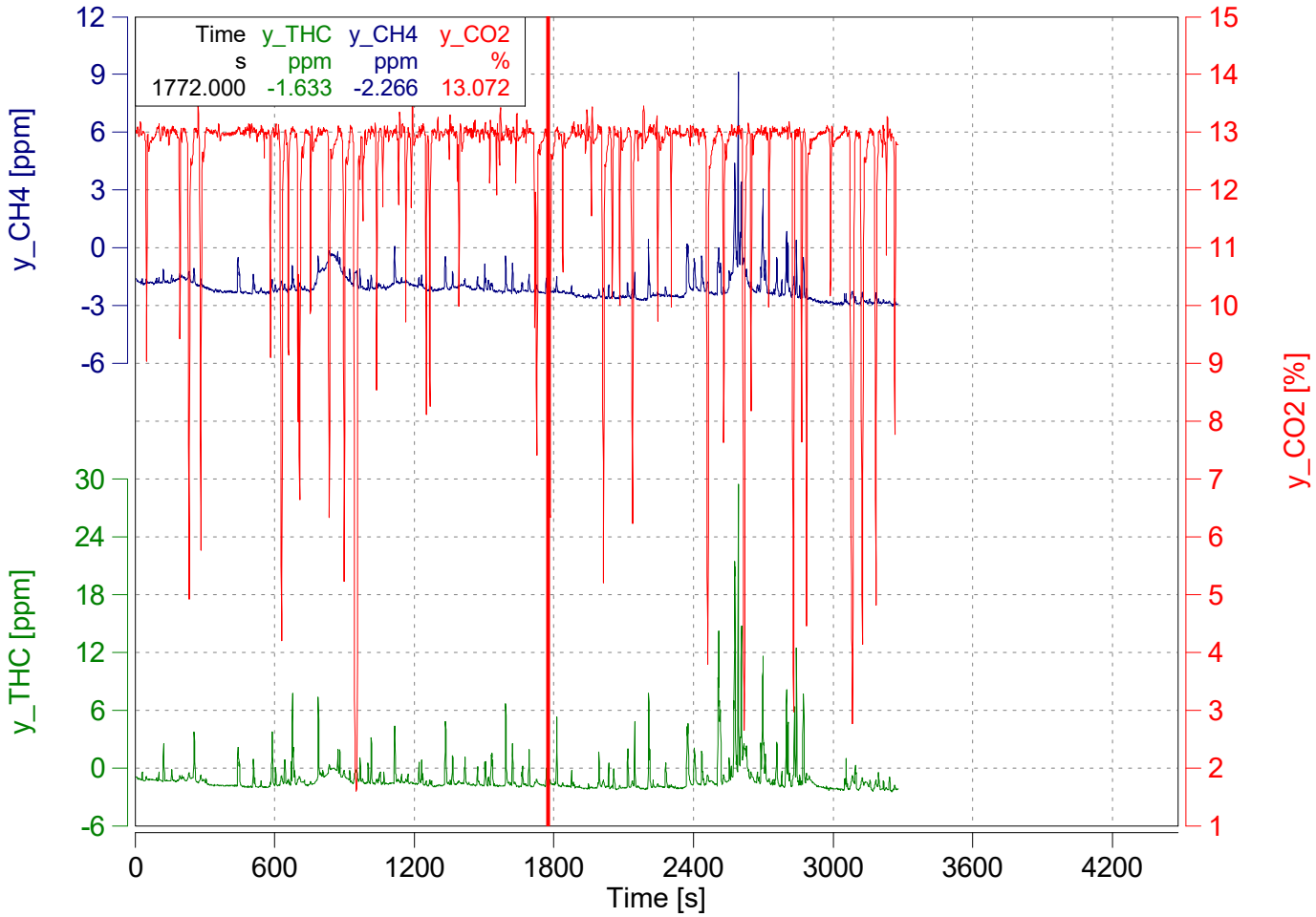
ncerto Version: 504 Build 119, Serial Number: 1604
D.V.E Post-Processing: DT_1R4.1_B340
islation:

Vehicle: L447-2128 /
Engine: /
NOx Ambient Condition Corr.: 7 - CFR40 §1065.670
Dry / Wet Corr.: 2 - CFR40 §86.1342-90

'LA City Route (Default)'
Start Date: 05/12/2021
Start Time: 10:50:28.0

AVL

Concerto M.O.V.E, 2019



Absolute Time Shifts

y_THC	s	-5.2
y_CH4	s	-7.2

Reset Time Shifts in Plot

Apply Current Values

ncerto Version: 504 Build 119, Serial Number: 1604
O.V.E Post-Processing: DT_1R4.1_B340
islation:

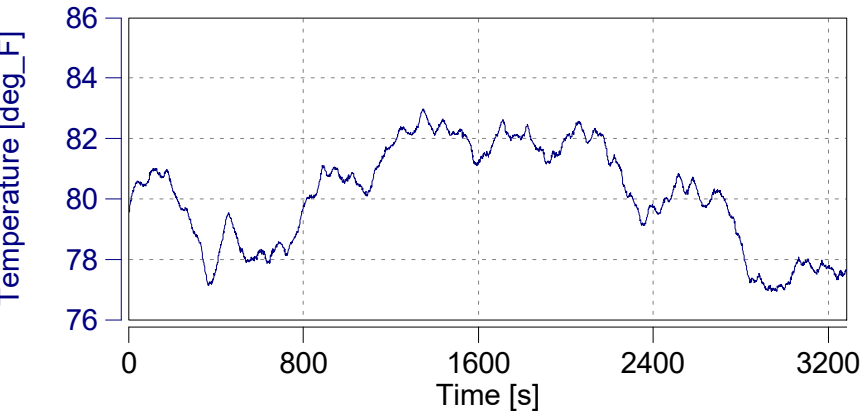
Vehicle: L447-2128 /
Engine: /
NOx Ambient Condition Corr.: 7 - CFR40 §1065.670
Dry / Wet Corr.: 2 - CFR40 §86.1342-90

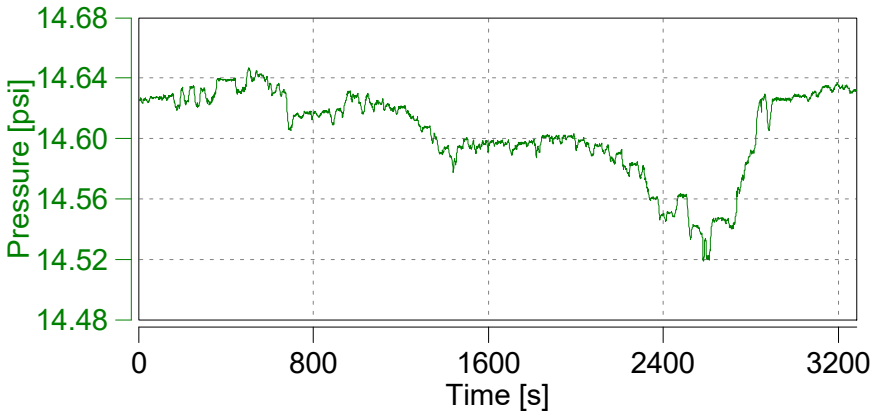
ase: L447-2128
age: Ambient Conditions

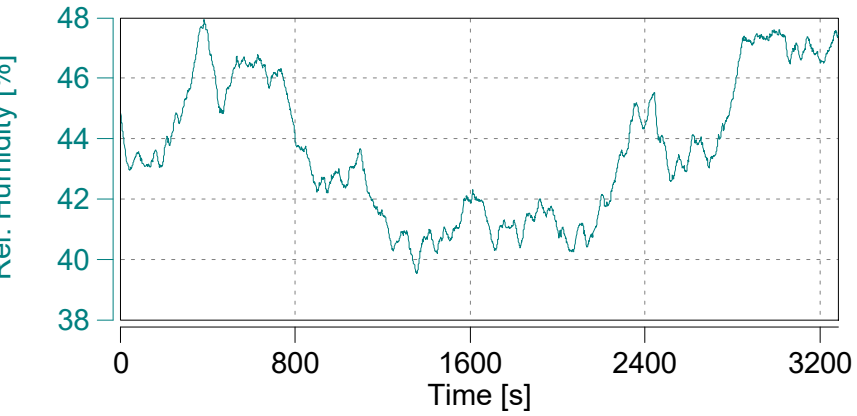
'LA City Route (Default)'
Start Date: 05/12/2021
Start Time: 10:50:28.0

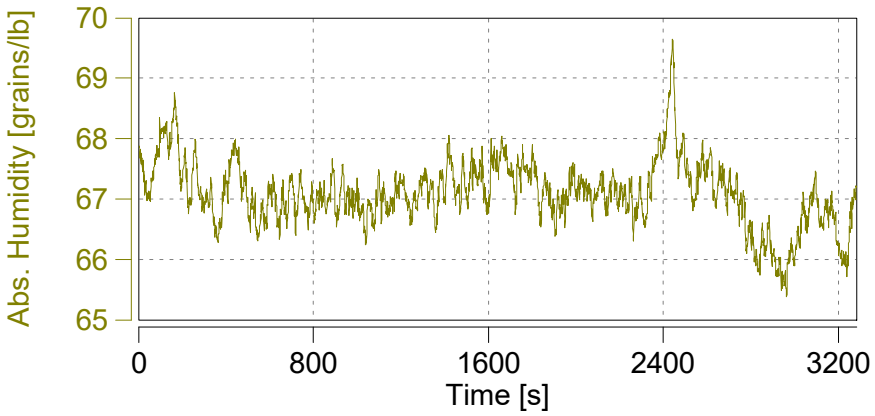
AVL

Concerto M.O.V.E, 2019









ncerto Version: 504 Build 119, Serial Number: 1604
O.V.E Post-Processing: DT_1R4.1_B340
islation:

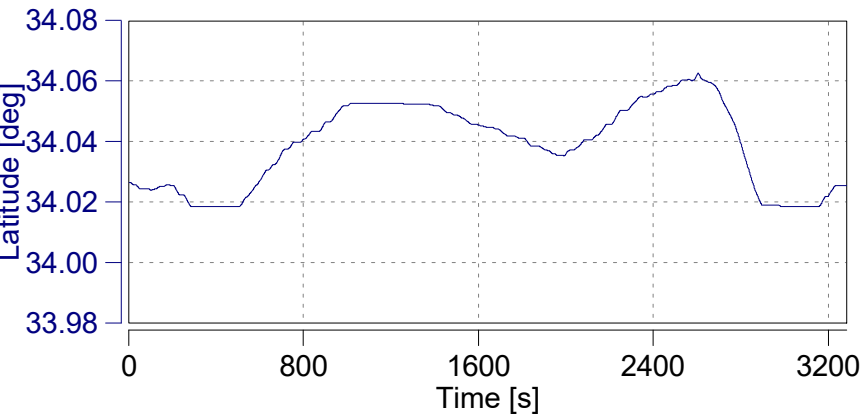
Vehicle: L447-2128 /
Engine: /
NOx Ambient Condition Corr.: 7 - CFR40 §1065.670
Dry / Wet Corr.: 2 - CFR40 §86.1342-90

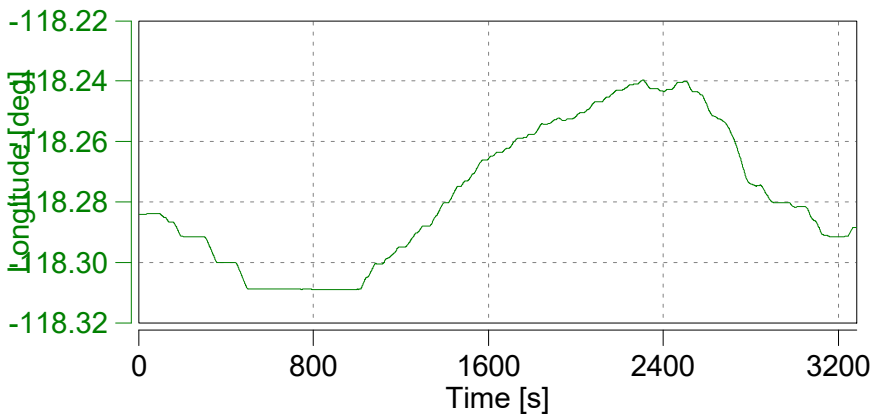
ase: L447-2128
age: GPS

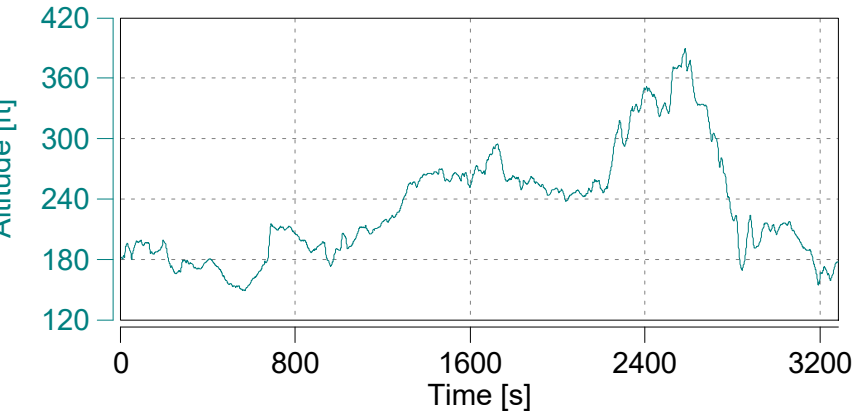
'LA City Route (Default)'
Start Date: 05/12/2021
Start Time: 10:50:28.0

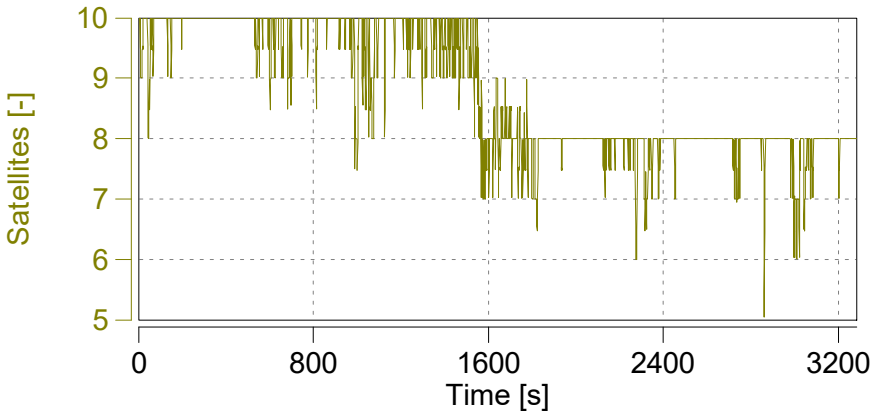
AVL

Concerto M.O.V.E, 2019



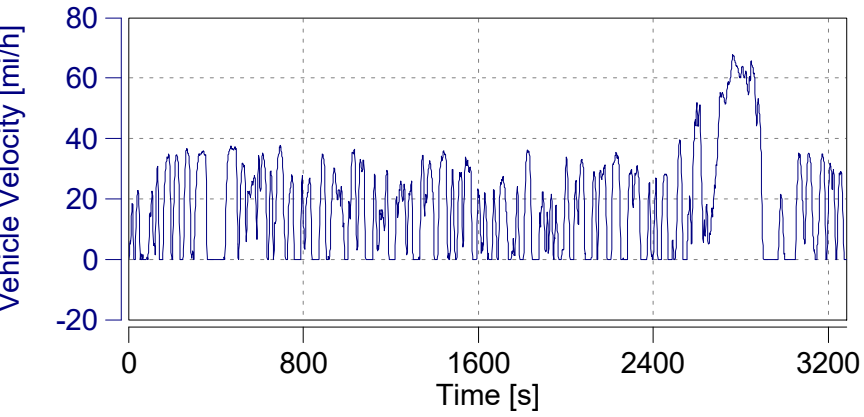


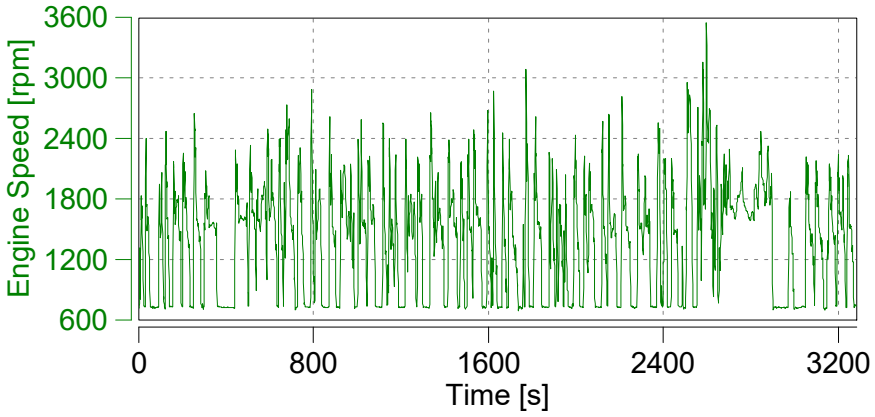


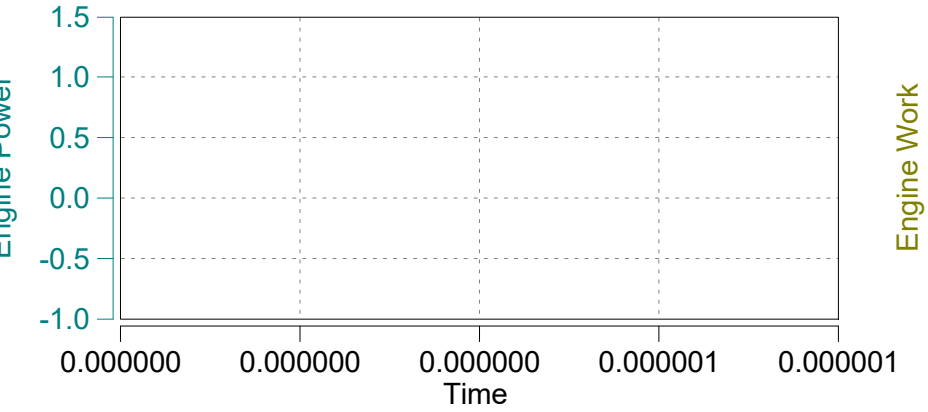


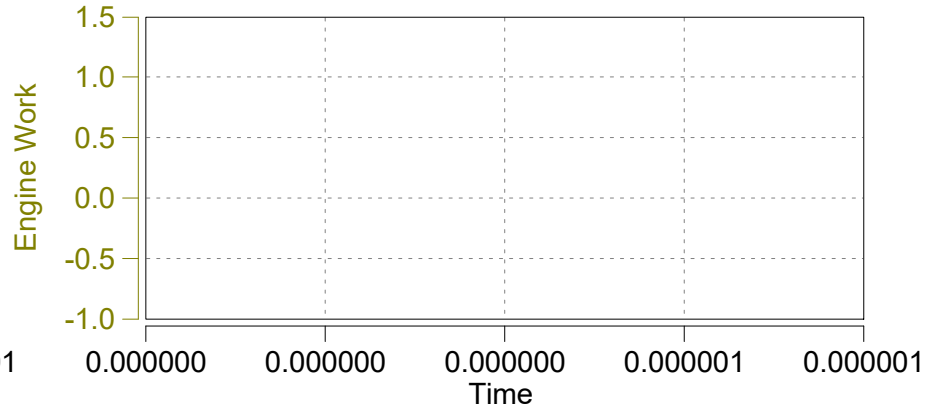
ncerto Version: 504 Build 119, Serial Number: 1604
O.V.E Post-Processing: DT_1R4.1_B340
islation:

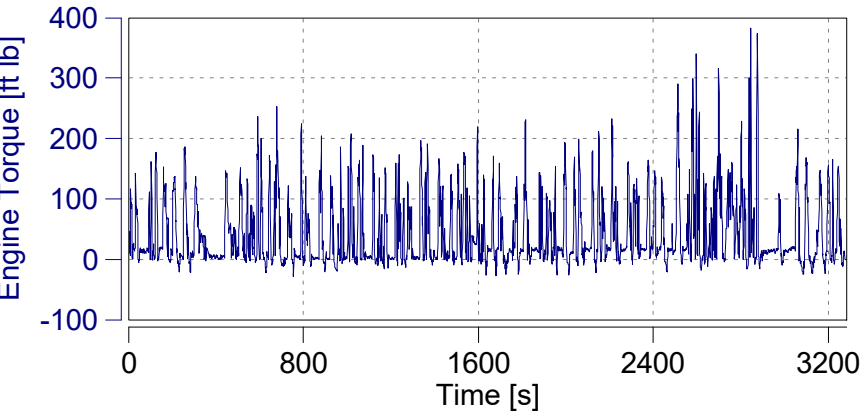
Vehicle: L447-2128 /
Engine: /
NOx Ambient Condition Corr.: 7 - CFR40 §1065.670
Dry / Wet Corr.: 2 - CFR40 §86.1342-90

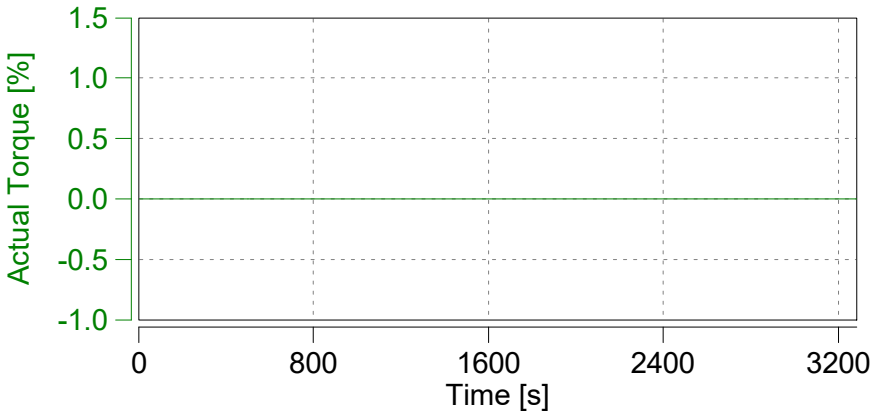

Vehicle Velocity [mi/h]
80
60
40
20
0
-20
0
800
1600
2400
3200
Time [s]

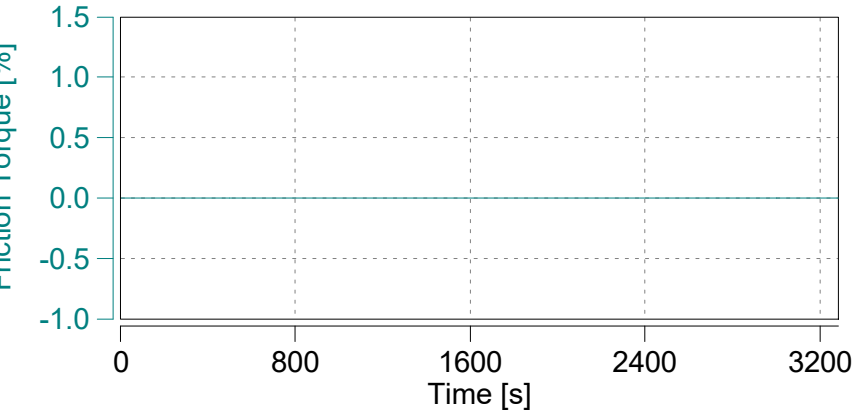

Engine Speed [rpm]
3600
3000
2400
1800
1200
600
0
800
1600
2400
3200
Time [s]

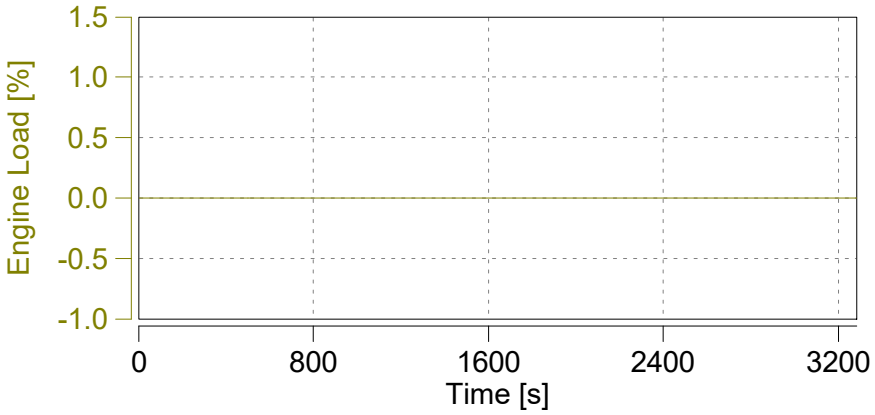

Engine Power
1.5
1.0
0.5
0.0
-0.5
-1.0
0.000000
0.000000
0.000000
0.000001
0.000001
Time


Engine Work
1.5
1.0
0.5
0.0
-0.5
-1.0
0.000000
0.000000
0.000000
0.000001
0.000001
Time


Engine Torque [ft lb]
400
300
200
100
0
-100
0
800
1600
2400
3200
Time [s]


Actual Torque [%]
1.5
1.0
0.5
0.0
-0.5
-1.0
0
800
1600
2400
3200
Time [s]


1.5
1.0
0.5
0.0
-0.5
-1.0
0
800
1600
2400
3200
Time [s]

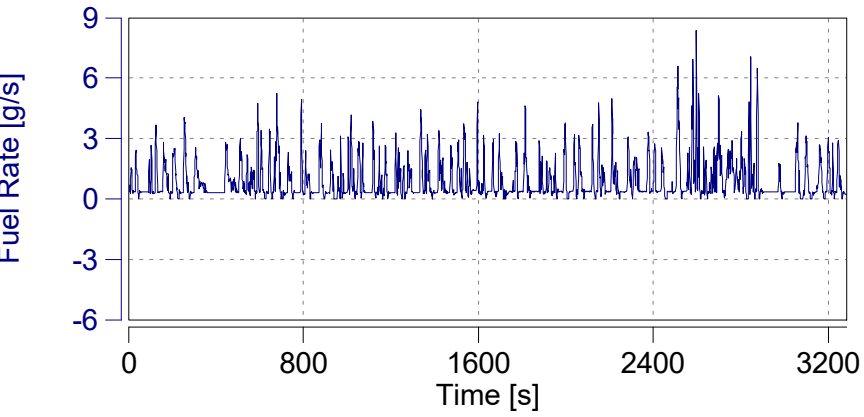

Engine Load [%]
1.5
1.0
0.5
0.0
-0.5
-1.0
0
800
1600
2400
3200
Time [s]

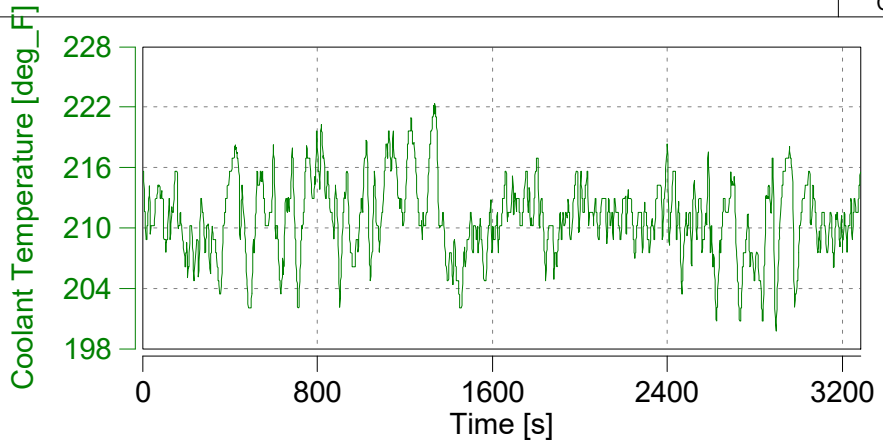
ase: L447-2128
age: Engine (3)

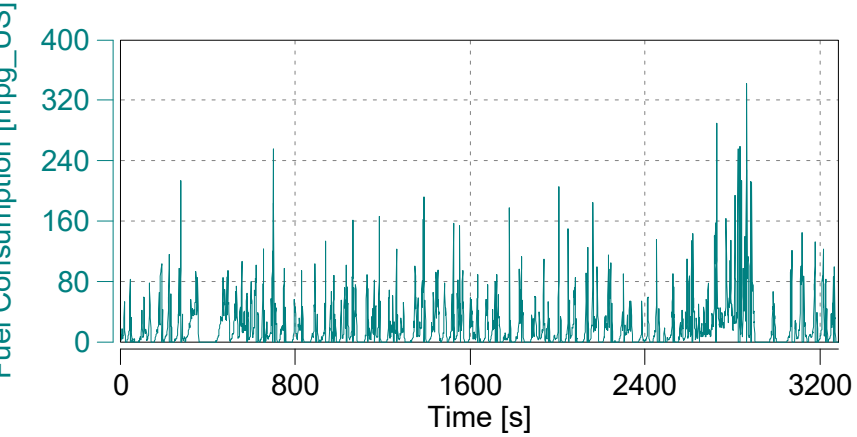
'LA City Route (Default)'
Start Date: 05/12/2021
Start Time: 10:50:28.0

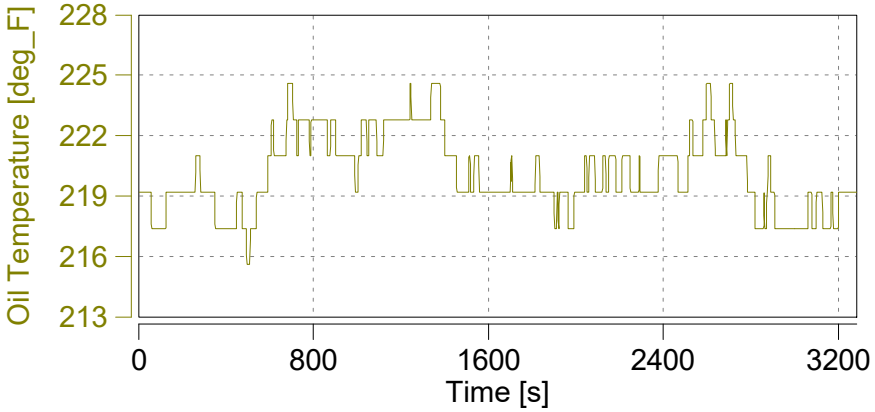
AVL

Concerto M.O.V.E, 2019









ncerto Version: 504 Build 119, Serial Number: 1604
O.V.E Post-Processing: DT_1R4.1_B340
islation:

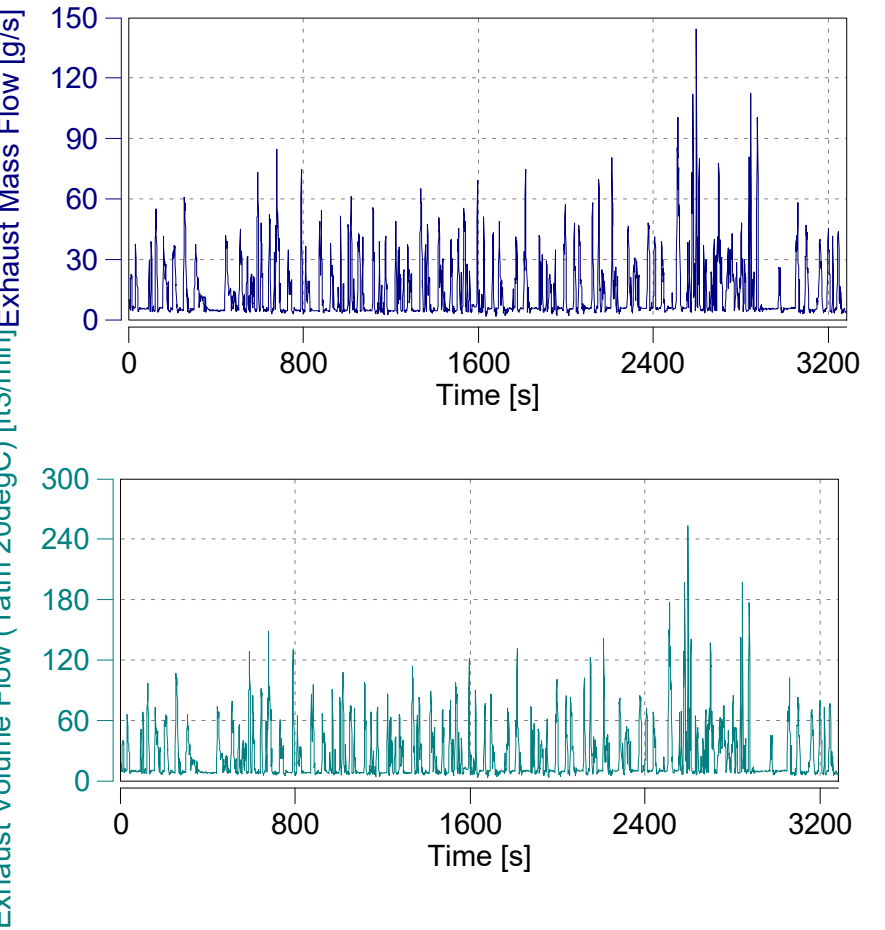
Vehicle: L447-2128 /
Engine: /
NOx Ambient Condition Corr.: 7 - CFR40 §1065.670
Dry / Wet Corr.: 2 - CFR40 §86.1342-90

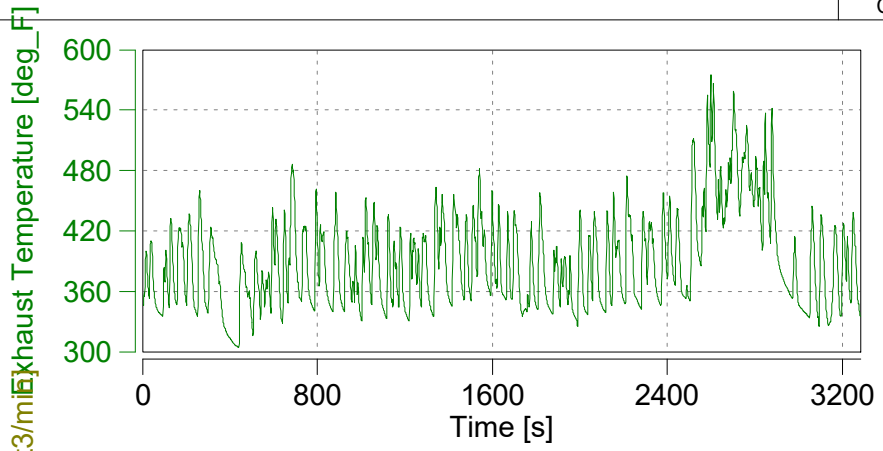
ase: L447-2128
age: Exhaust Flow (1)

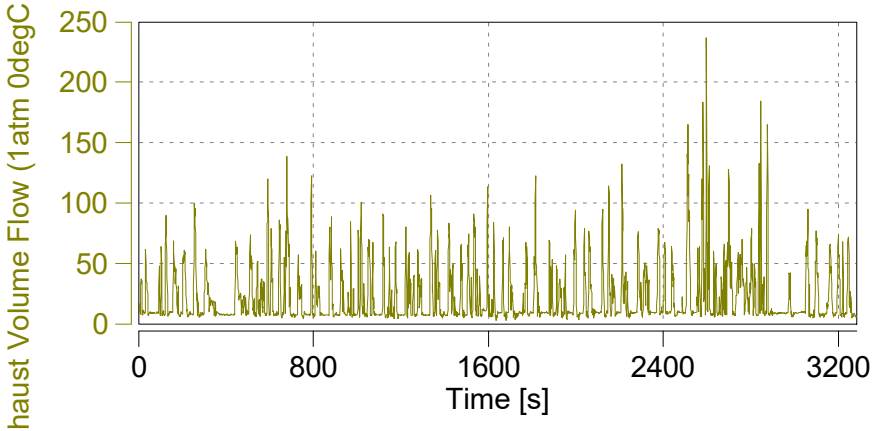
'LA City Route (Default)'
Start Date: 05/12/2021
Start Time: 10:50:28.0

AVL

Concerto M.O.V.E, 2019







ncerto Version: 504 Build 119, Serial Number: 1604
O.V.E Post-Processing: DT_1R4.1_B340
islation:

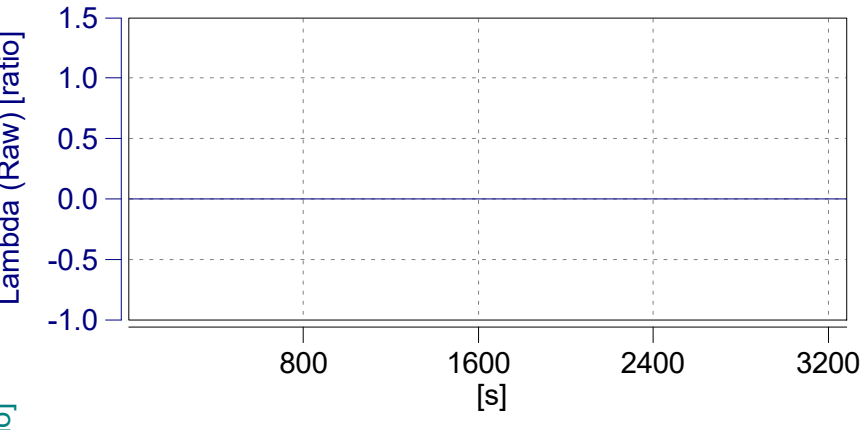
Vehicle: L447-2128 /
Engine: /
NOx Ambient Condition Corr.: 7 - CFR40 §1065.670
Dry / Wet Corr.: 2 - CFR40 §86.1342-90

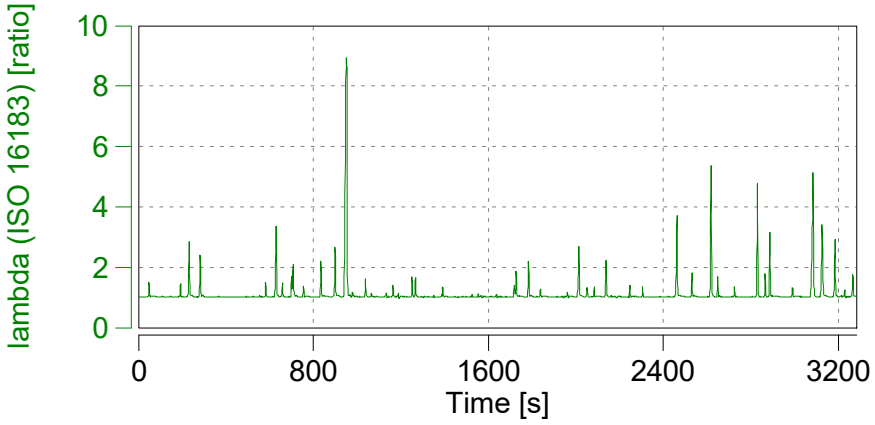
ase: L447-2128
age: Exhaust Flow (2)

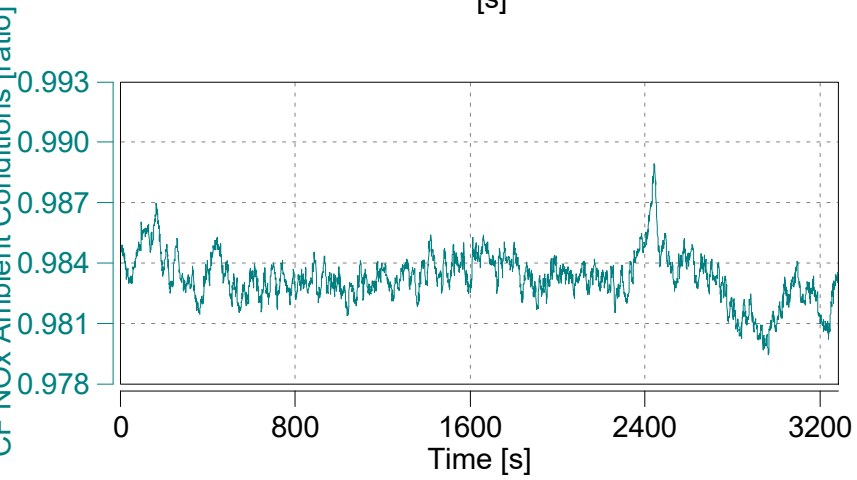
'LA City Route (Default)'
Start Date: 05/12/2021
Start Time: 10:50:28.0

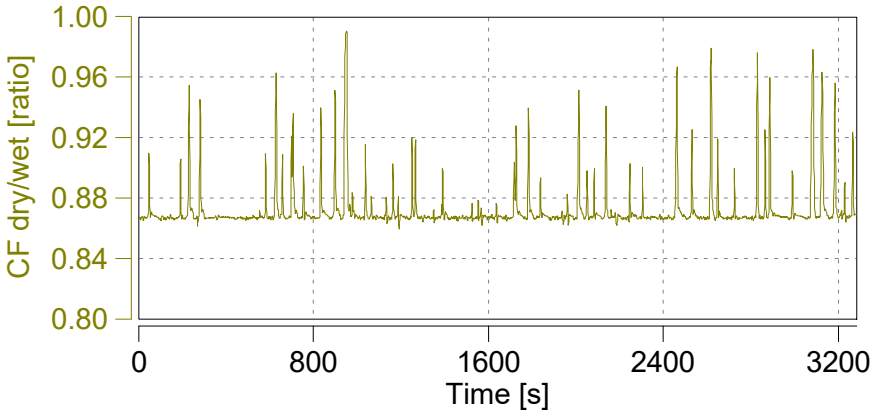
AVL

Concerto M.O.V.E, 2019









ncerto Version: 504 Build 119, Serial Number: 1604
O.V.E Post-Processing: DT_1R4.1_B340
islation:

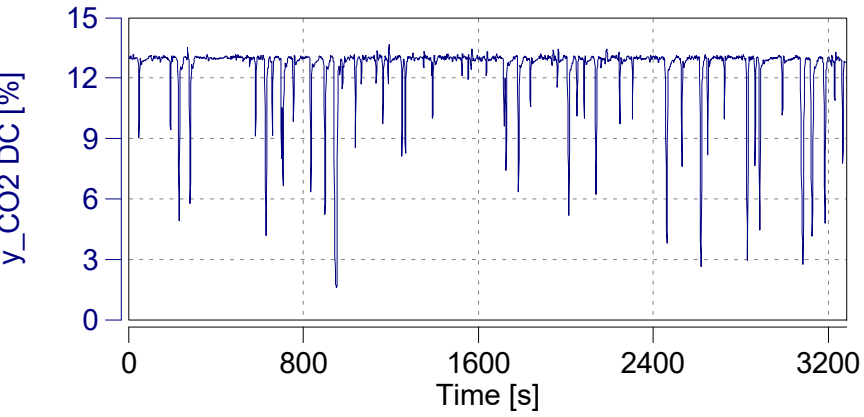
Vehicle: L447-2128 /
Engine: /
NOx Ambient Condition Corr.: 7 - CFR40 §1065.670
Dry / Wet Corr.: 2 - CFR40 §86.1342-90

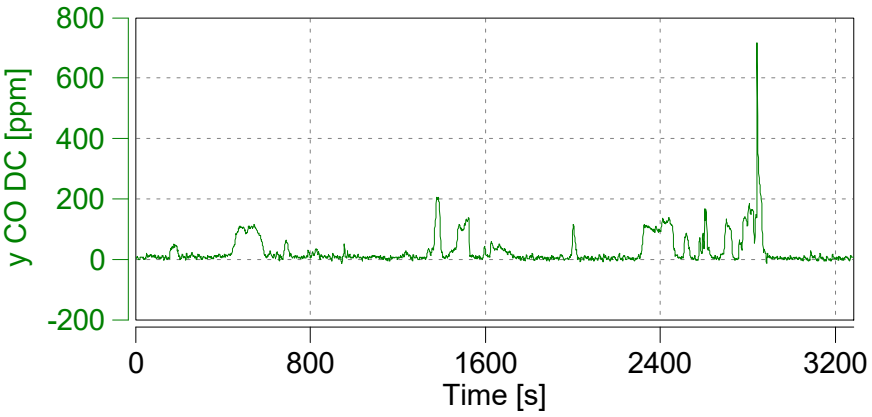
ase: L447-2128
age: Corrected Emissions (1)

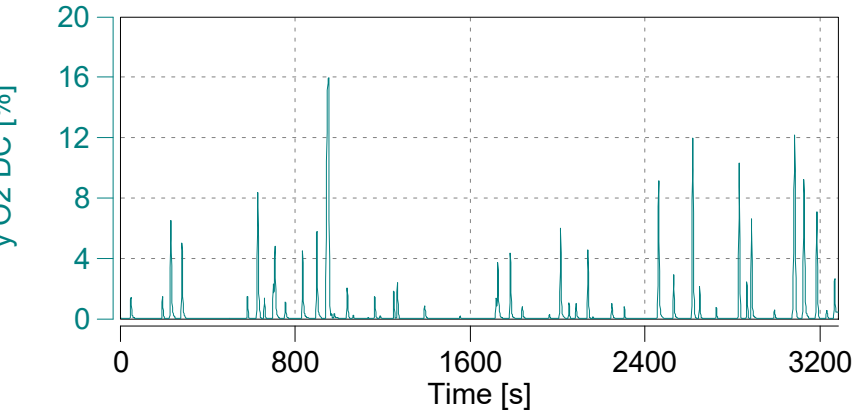
'LA City Route (Default)'
Start Date: 05/12/2021
Start Time: 10:50:28.0

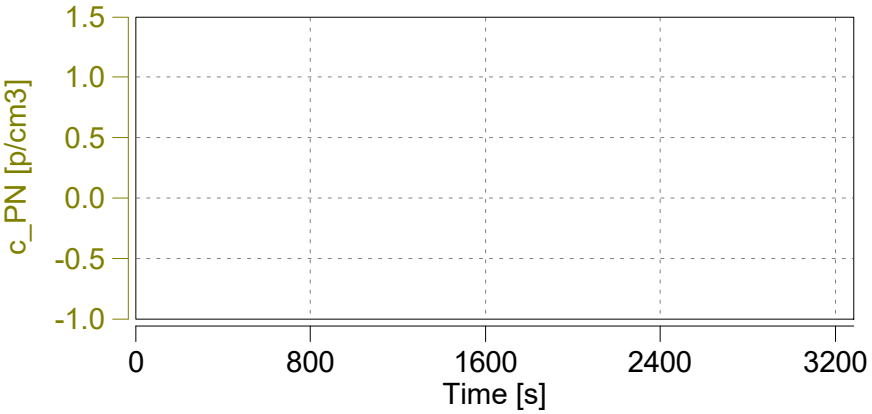
AVL

Concerto M.O.V.E, 2019









ncerto Version: 504 Build 119, Serial Number: 1604
O.V.E Post-Processing: DT_1R4.1_B340
islation:

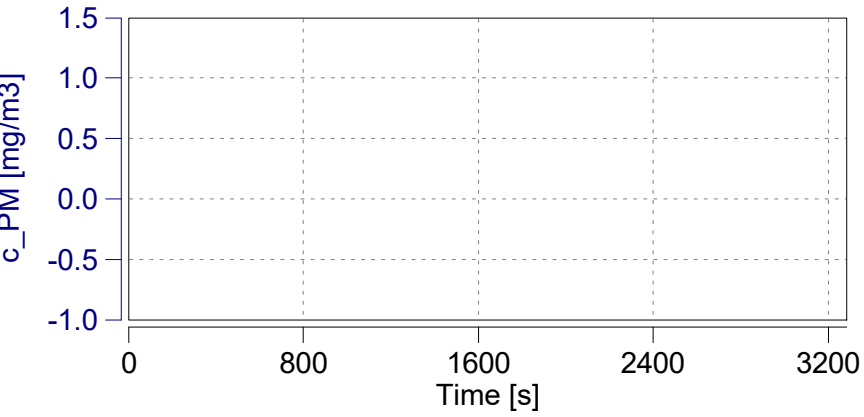
Vehicle: L447-2128 /
Engine: /
NOx Ambient Condition Corr.: 7 - CFR40 §1065.670
Dry / Wet Corr.: 2 - CFR40 §86.1342-90

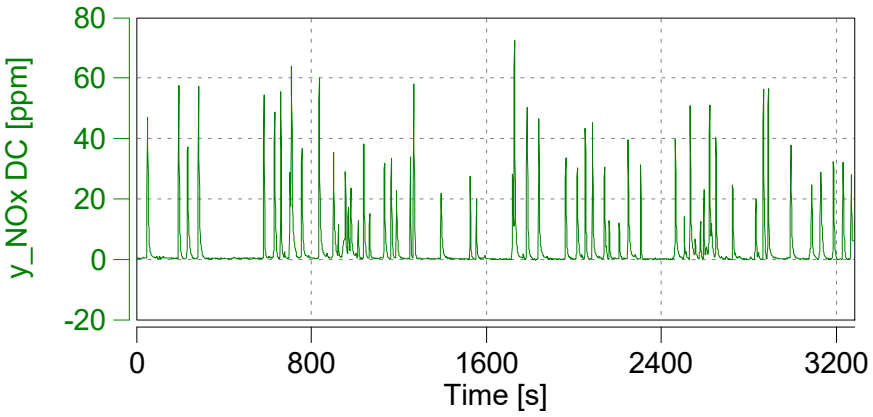
ase: L447-2128
age: Corrected Emissions (2)

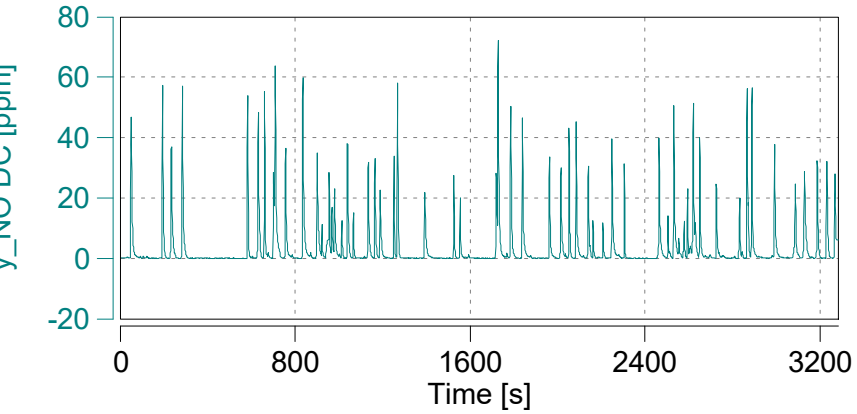
'LA City Route (Default)'
Start Date: 05/12/2021
Start Time: 10:50:28.0

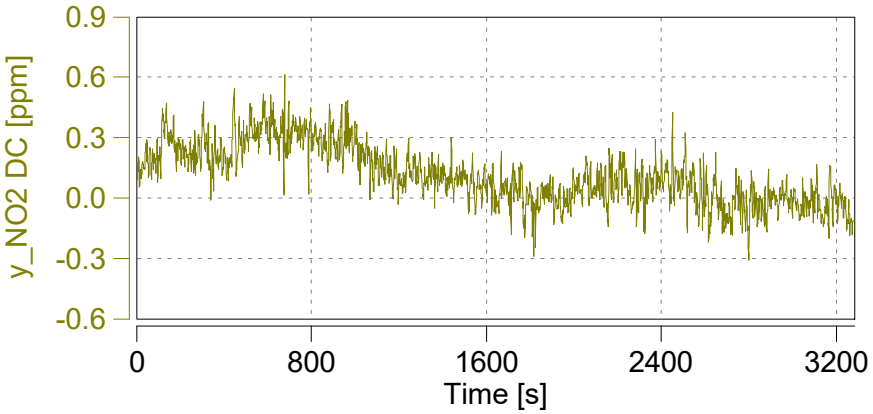
AVL

Concerto M.O.V.E, 2019









ncerto Version: 504 Build 119, Serial Number: 1604
O.V.E Post-Processing: DT_1R4.1_B340
islation:

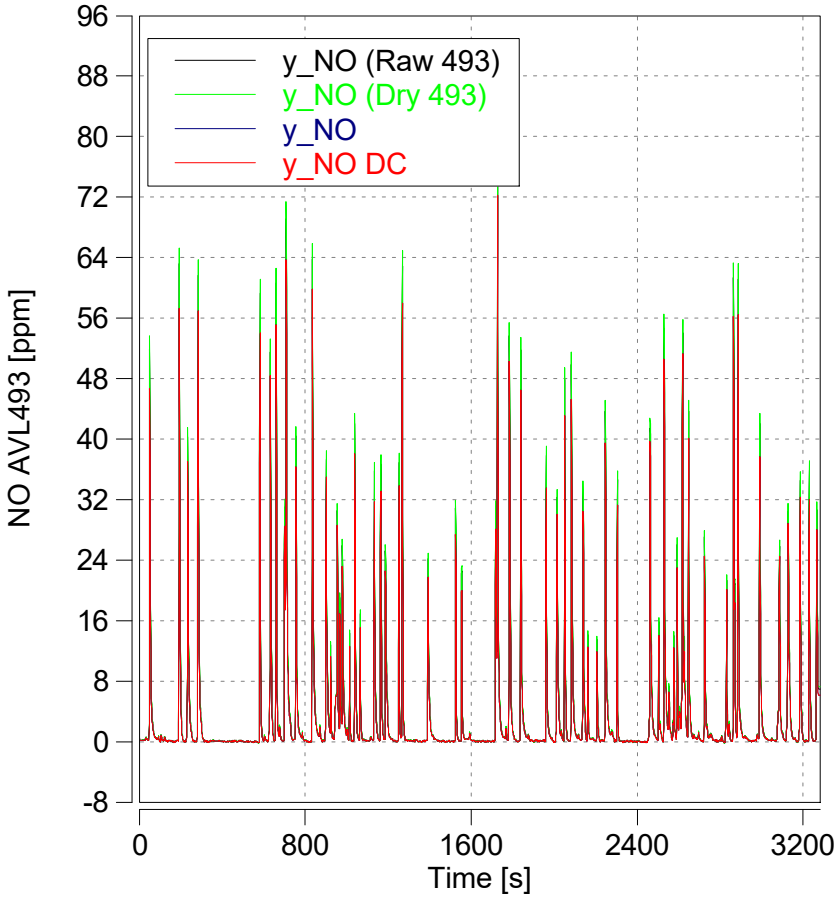
Vehicle: L447-2128 /
Engine: /
NOx Ambient Condition Corr.: 7 - CFR40 §1065.670
Dry / Wet Corr.: 2 - CFR40 §86.1342-90

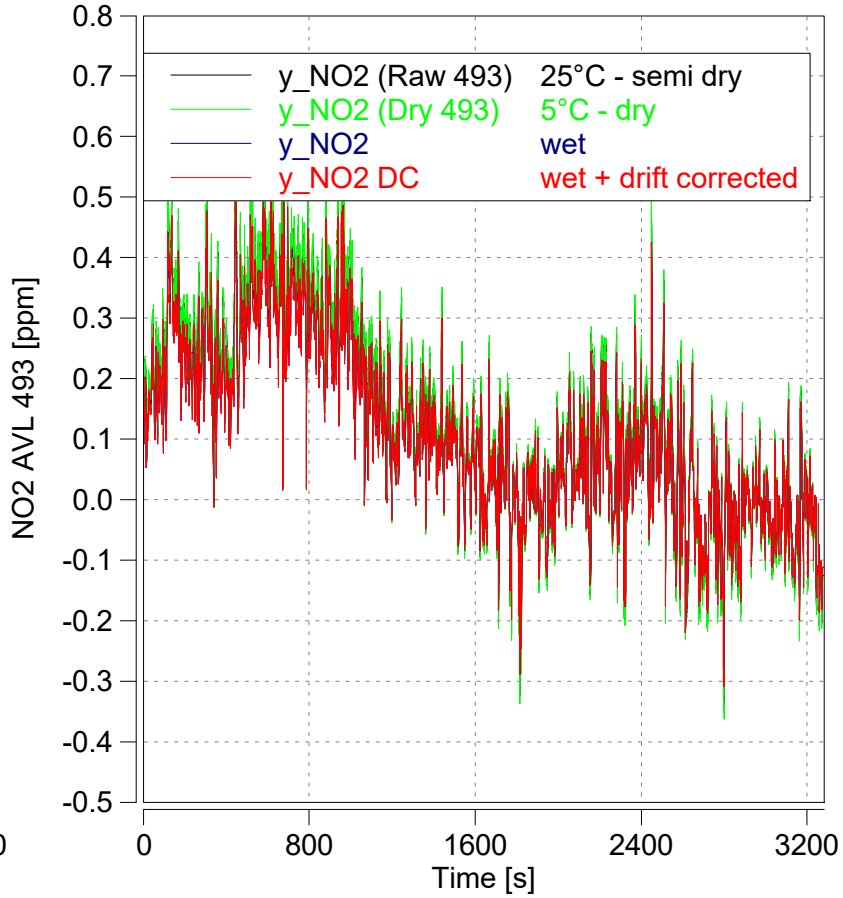
ase: L447-2128
age: Corrected Emissions (3)

'LA City Route (Default)'
Start Date: 05/12/2021
Start Time: 10:50:28.0

AVL

Concerto M.O.V.E, 2019

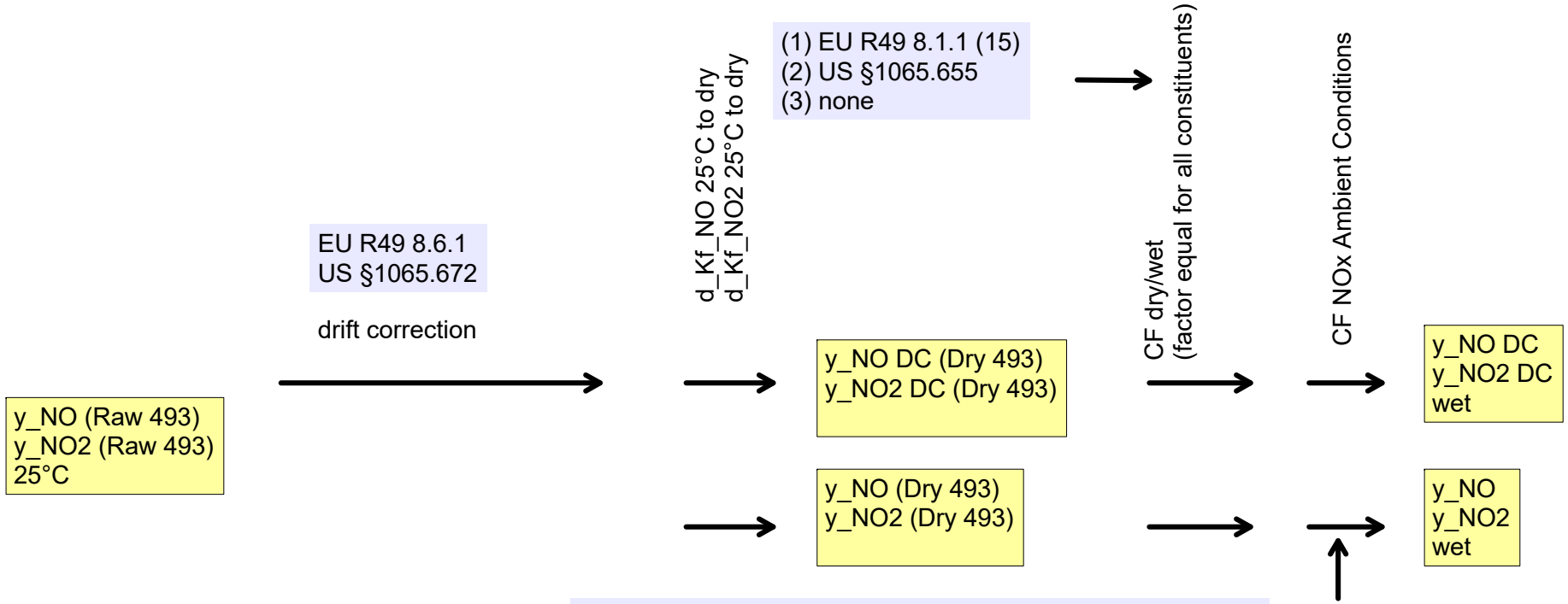




ncerto Version: 504 Build 119, Serial Number: 1604
O.V.E Post-Processing: DT_1R4.1_B340
islation:

Vehicle: L447-2128 /
Engine: /
NOx Ambient Condition Corr.: 7 - CFR40 §1065.670
Dry / Wet Corr.: 2 - CFR40 §86.1342-90

NOx - AVL 493

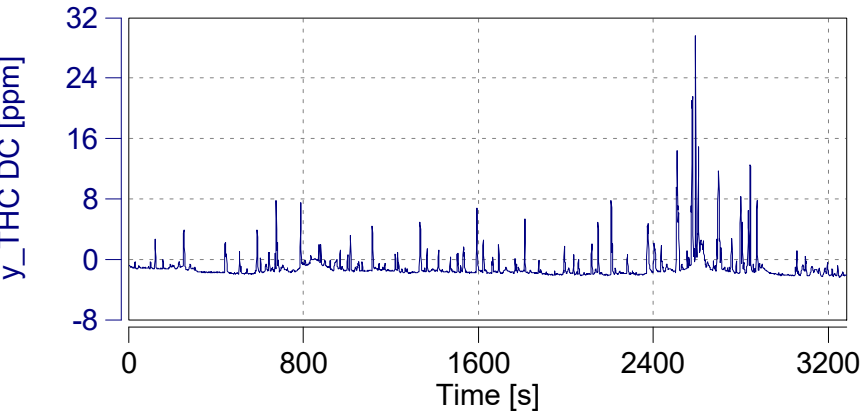


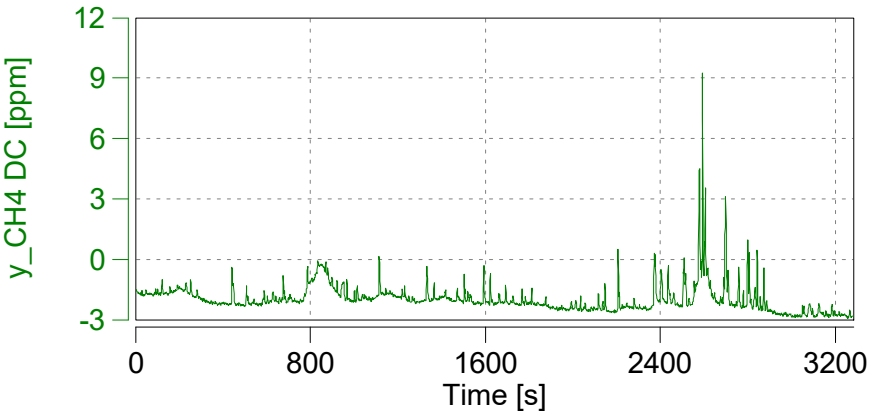
(1) HD Diesel Engine SwRI FinalReport 08-2597, 1999
(2) humidity only
(3) equivalent uncorrected NOx limit method for EU in service
(4) US §40.86.1342.94 Diesel
(5) US §40.86.1342.94 SI
(6) US §40.86.1370–2007 (default US)
(7) US 40.1065.670
(8) none (default EU)

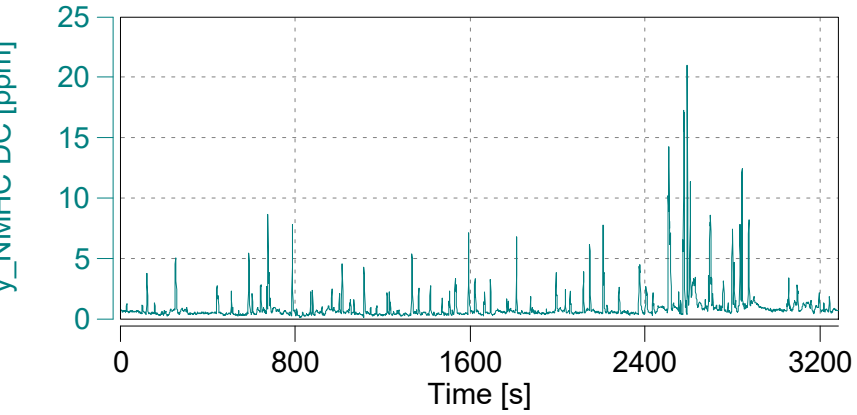
'LA City Route (Default)'
Start Date: 05/12/2021
Start Time: 10:50:28.0

AVL

Concerto M.O.V.E, 2019







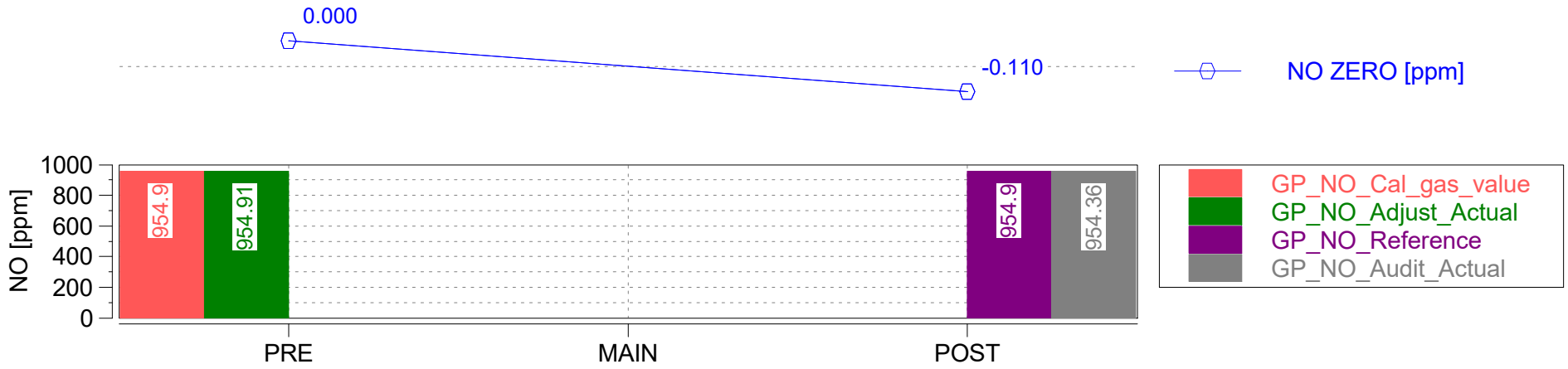
ncerto Version: 504 Build 119, Serial Number: 1604
O.V.E Post-Processing: DT_1R4.1_B340
islation:

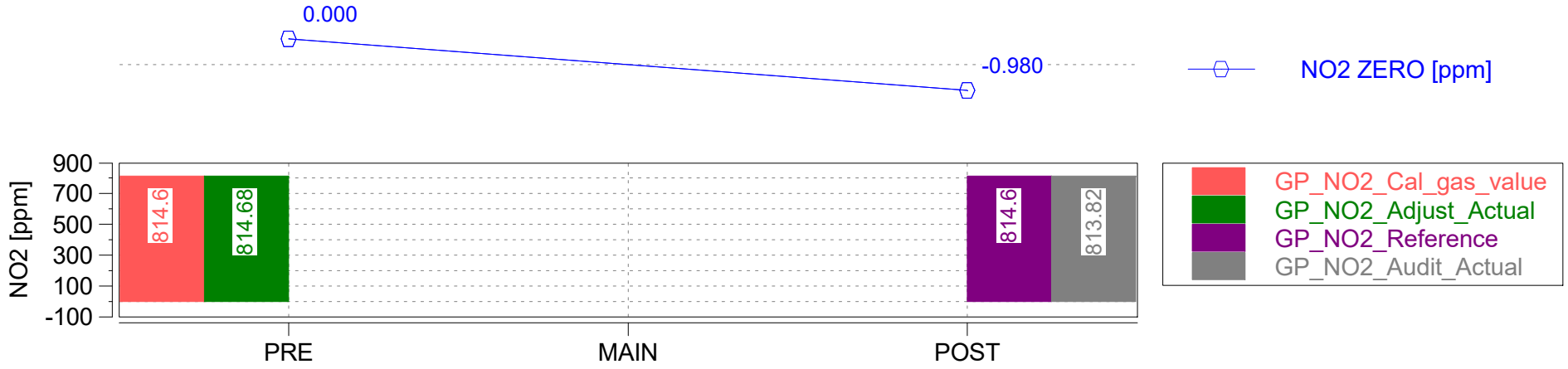
Vehicle: L447-2128 /
Engine: /
NOx Ambient Condition Corr.: 7 - CFR40 §1065.670
Dry / Wet Corr.: 2 - CFR40 §86.1342-90

ase: L447-2128
age: NO/NO2/NOx Zero - Span

'LA City Route (Default)'
Start Date: 05/12/2021
Start Time: 10:50:28.0

AVL
Concerto M.O.V.E, 2019





ncerto Version: 504 Build 119, Serial Number: 1604
O.V.E Post-Processing: DT_1R4.1_B340
islation:

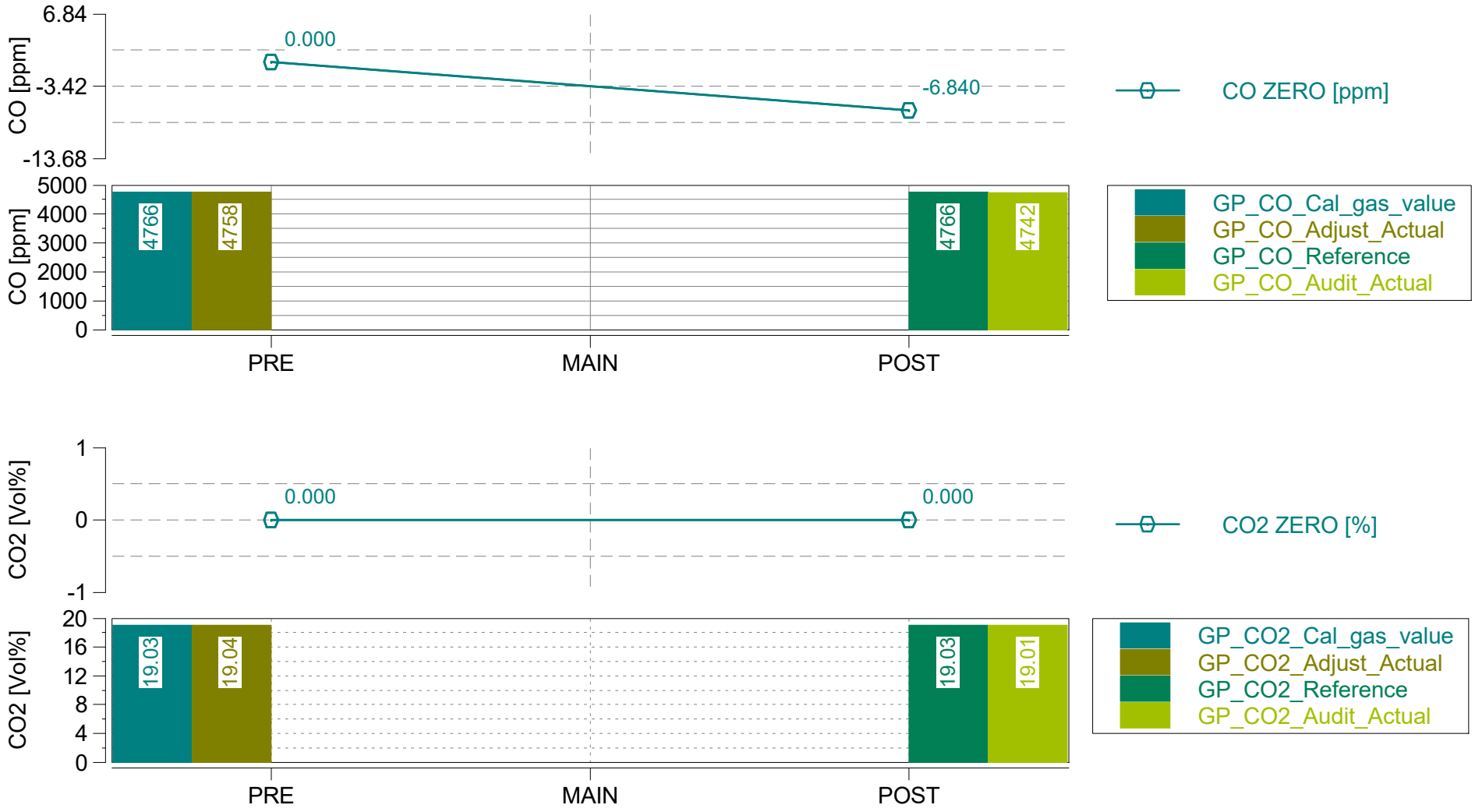
Vehicle: L447-2128 /
Engine: /
NOx Ambient Condition Corr.: 7 - CFR40 §1065.670
Dry / Wet Corr.: 2 - CFR40 §86.1342-90

ase: L447-2128
age: CO/CO2 Zero - Span

'LA City Route (Default)'
Start Date: 05/12/2021
Start Time: 10:50:28.0

AVL

Concerto M.O.V.E, 2019



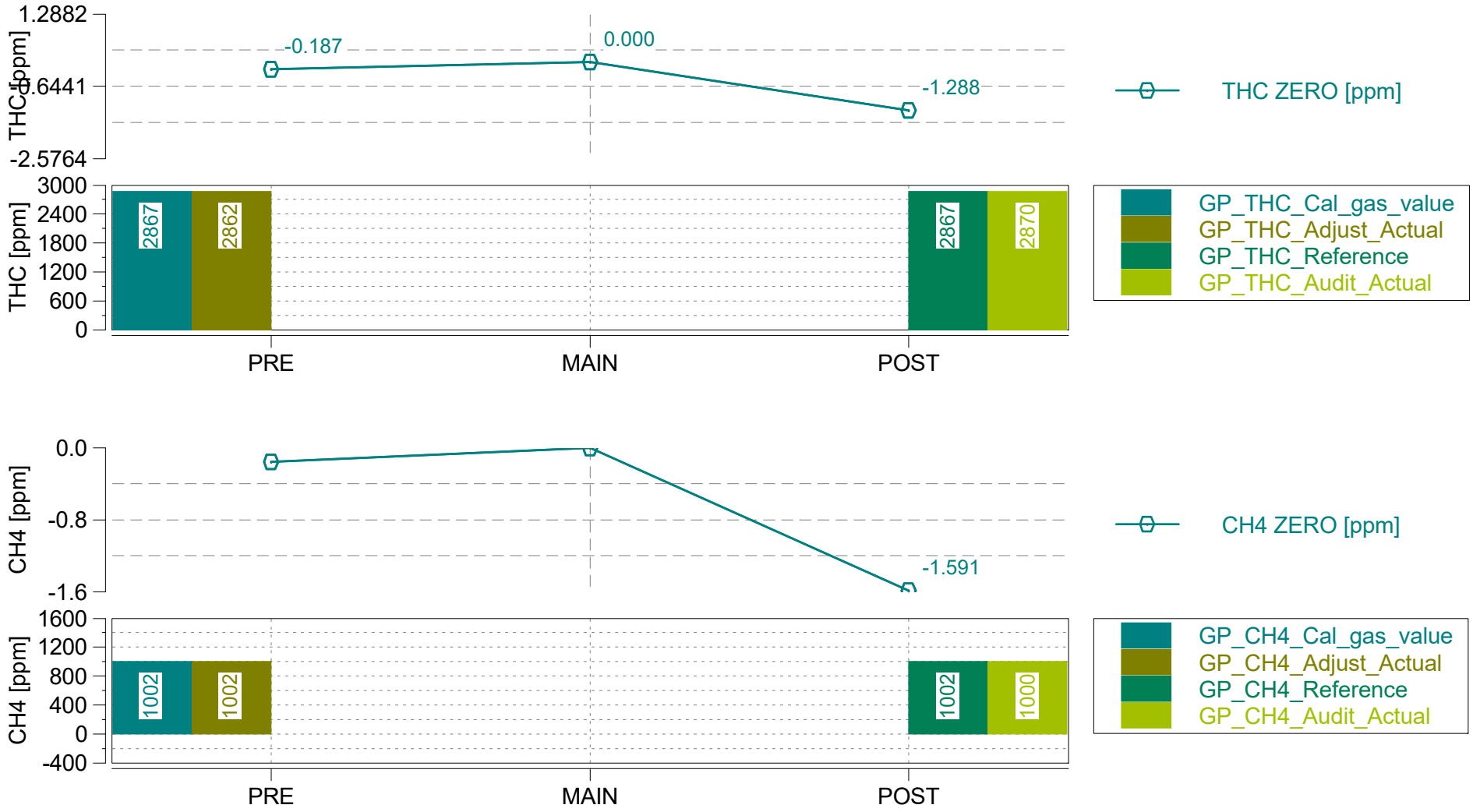
ncerto Version: 504 Build 119, Serial Number: 1604
O.V.E Post-Processing: DT_1R4.1_B340
islation:

Vehicle: L447-2128 /
Engine: /
NOx Ambient Condition Corr.: 7 - CFR40 §1065.670
Dry / Wet Corr.: 2 - CFR40 §86.1342-90

ase: L447-2128
age: THC/CH4 Zero - Span

'LA City Route (Default)'
Start Date: 05/12/2021
Start Time: 10:50:28.0

AVL
Concerto M.O.V.E, 2019



ncerto Version: 504 Build 119, Serial Number: 1604
O.V.E Post-Processing: DT_1R4.1_B340
islation:

Vehicle: L447-2128 /
Engine: /
NOx Ambient Condition Corr.: 7 - CFR40 §1065.670
Dry / Wet Corr.: 2 - CFR40 §86.1342-90

§	criterium	condition	value	unit	pass/fail
AS 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%	**0.08**	**%**	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	0597
Firmware Version	V1.16
Main Test Date	2021-05-12
Leak Check Age [days]	0

Device ID	AVL4925
Serial Number	175
Firmware Version	1.20.0.8

EFM

Device ID	AVL495
Serial Number	00915
Serial Number Tube	01115
Firmware Version	V1.13

System Control

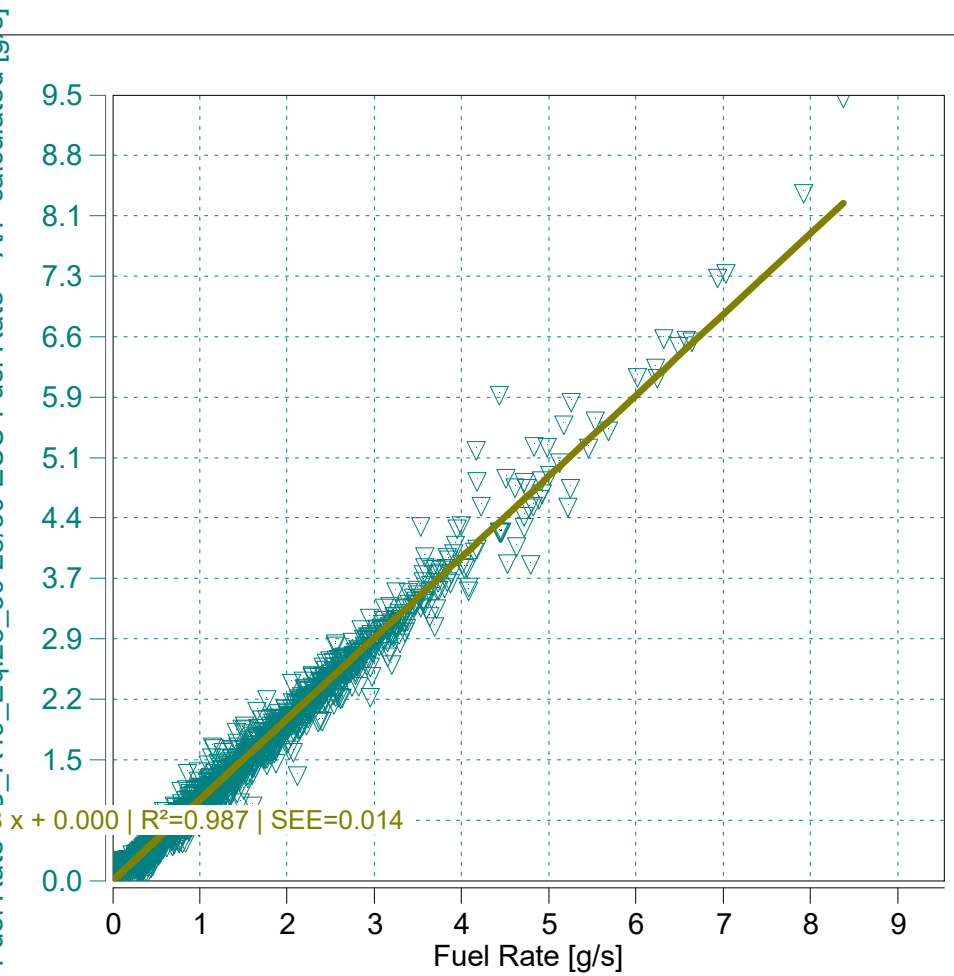
SC Version	V2.6_212
SC Serial Number	60300923

ase: L447-2128
age: Fuel Rate ECU vs. Calculated

'LA City Route (Default)'
Start Date: 05/12/2021
Start Time: 10:50:28.0

AVL

Concerto M.O.V.E, 2019



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

y = 0.9808 x + 0.000 | R²=0.987 | SEE=0.014
m = 0.98 (0.9 - 1.1 recommended)
R² = 0.99 (min 0.9 mandatory)

Data from - to [% of Maximum]

0 100

ncerto Version: 504 Build 119, Serial Number: 1604
O.V.E Post-Processing: DT_1R4.1_B340
islation:

Vehicle: L447-2128 /
Engine: /
NOx Ambient Condition Corr.: 7 - CFR40 §1065.670
Dry / Wet Corr.: 2 - CFR40 §86.1342-90