

*In re: Chrysler-Dodge-Jeep Ecodiesel Marketing, Sales Practices, and
Products Liability Litigation, No. 3:17-md-02777 (N.D. Cal.)*

**PEMS Summary Report
Pursuant to Paragraph 59.e of the Consent Decree**

November 30, 2021

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I. Background

On January 10, 2019, FCA US LLC (“FCA”), Stellantis N.V. (formerly known as Fiat Chrysler Automobiles N.V.), V.M. Motori S.p.A., and V.M. North America, Inc. (collectively, the “Defendants”) entered into a consent decree with the United States, acting on behalf of the U.S. Environmental Protection Agency (“EPA”), and the State of California, acting by and through the California Air Resources Board (“CARB”) and the California Attorney General, related to model year (“MY”) 2014 to 2016 Ram 1500 and MY 2014 to 2016 Jeep Grand Cherokee vehicles equipped with 3.0 liter ECODIESEL engines (“Subject Vehicles”). The Court granted final approval of the Consent Decree on May 3, 2019, *In re: Chrysler-Dodge-Jeep EcoDiesel Marketing, Sales Practices, and Products Liability Litigation*, No. 3:17-md-02777 (N.D. Cal. May 3, 2019), ECF No. 562 (“Consent Decree”).

Paragraph 59.e of the Consent Decree requires that Defendants submit a Summary Report to EPA and CARB (“the Agencies”) for each model year for testing performed under Paragraph 59.a. FCA submits this Summary Report of PEMS testing pursuant to Paragraph 59.a for MY 2021, which is its final Summary Report.¹ FCA will post the Summary Report, redacted as appropriate, according to Paragraphs 59.e and 78 of the Consent Decree. As stated in Paragraph 59.h, “[t]he Parties agree and acknowledge that neither United States nor California law sets forth a standard by which PEMS testing can be used to determine compliance for purposes of certification under Title II of the Clean Air Act.”

A separate Summary Report for testing pursuant to Paragraph 59.b for MY 2021 will be prepared by FCA’s Independent Third-Party Emissions Tester, Sensors Inc.

Pursuant to 40 C.F.R. Part 2, subpart B, Cal. Gov’t Code § 6254.7(d), and Paragraph 119 of the Consent Decree, FCA requests confidential treatment of this submission.

II. Executive Summary

Paragraph 59.a requires that Defendants perform PEMS testing on vehicles from certain test groups selected to cover, in the aggregate, the full range of configurations of emission control systems on light-duty vehicles for MY 2021 across all FCA brands. FCA’s Paragraph 59.a PEMS testing was performed at its Chelsea Proving Grounds (“CPG”) in Chelsea, Michigan, under real-world driving conditions over a range of ambient temperatures and pressures. As required by Paragraph 59.c.ii, FCA measured the following five constituents: oxides of nitrogen (“NOx”), total hydrocarbons (“THC”), non-methane hydrocarbons (“NMHC”), carbon monoxide (“CO”), and carbon dioxide (“CO2”).

FCA performed PEMS testing on vehicles from ten test groups. For each selected vehicle, FCA completed: (1) Steady State PEMS Test (stepped nine-bag); (2) Transient PEMS test; and (3) as requested by EPA and CARB, an 80 MPH Steady State Cruise PEMS Test. The Steady State PEMS Test and the 80 MPH Steady State Cruise PEMS Test were run on FCA’s oval track at CPG. The Transient PEMS test comprised of three cycle routes. Each Transient PEMS test cycle route was designed to ensure a mix of endurance, speed, grade, key off and on, and stops to simulate real-world driving conditions.

¹ See Consent Decree ¶ 59.a (“Defendants shall test certain MY 2019, 2020, and 2021 light-duty motor vehicles using portable emissions measurement system (“PEMS”) testing.”).

FCA used PEMS units manufactured by Sensors, Inc. FCA performed weekly correlation testing on each PEMS unit and installed each unit according to the manufacturer’s guidelines.

FCA prepared for and conducted the PEMS testing according to test methods recorded before the testing commenced. FCA collected and processed the emission data pursuant to Paragraph 59.g and FCA’s approved PEMS Test Plan. Additionally, as requested by the Agencies, FCA provides to the Agencies cumulative NOx (g) data as a calculated signal from the second-by-second PEMS data for Paragraph 59.a PEMS testing. Further, relative to all of the second-by-second data for all (available) vehicle, engine, and PEMS parameters identified in Figure 3 below, FCA collected data for Paragraph 59.a. PEMS testing for the entire Steady State PEMS test, 80 MPH Steady State test, and the Transient PEMS test, including the transient portions of the Steady State PEMS test and the 80 MPH Steady State test. As agreed by the Agencies, FCA post-processed the Steady State PEMS test data and the 80 MPH Steady State test data to remove the transient portions from the averages calculated of the constituent pollutants. As further requested by the Agencies, FCA recorded Engine Coolant Temperature and EGR related OBD PIDS (if equipped) for gasoline and diesel vehicles for Paragraph 59.a PEMS testing.

The following Summary Report provides test results and additional detail describing all test methods used for FCA’s MY 2021 PEMS testing pursuant to Paragraph 59.a of the Consent Decree.

III. Paragraph 59.a Testing

1. Model Year 2021 Test Groups

FCA selected ten test groups to satisfy the requirements under Paragraphs 59.a of the Consent Decree. Paragraph 59.a requires PEMS testing of MY 2021 light-duty motor vehicles across all FCA brands. The Paragraph 59.a test groups were selected to cover, in the aggregate, the full range of emission control systems on those light-duty brand test groups. FCA lists its MY 2021 Paragraph 59.a Test Groups in Figure 1 below.

Light Duty Test Groups Containing								
	21MY Test Group	Engine	Transmission(s)	Driveline(s)	Fuel Type	Air System	Fuel System	Emission Standard
1	MCRXT03.65P5	3.6L, ESS	ZF 8 Speed, ZF 9 Speed, 6 Speed Manual	FWD, RWD, AWD, 4WD	Gasoline	Naturally Aspirated - 2 Step Lift	Port Injection	BIN 30,SULEV 30
2	MCRXT03.05PW	3.0L, ESS	ZF 8 Speed	RWD, 4WD	Diesel	Turbocharged	Direct Injection	BIN 160,LEV 160
3	MCRXV05.75P3	5.7L	ZF 8 Speed	RWD	Gasoline	Naturally Aspirated	Port Injection	BIN 125,ULEV125
4	MCRXT02.45P1	2.4L, ESS	ZF 9 Speed, Aisin 6 Speed	FWD, AWD	Gasoline	Naturally Aspirated Multi-Air	Port Injection	BIN 50, ULEV 50
5	MCRXT05.75P0	5.7L	ZF 8 Speed	RWD, AWD, 4WD	Gasoline	Naturally Aspirated	Port Injection	BIN 70,ULEV70
6	MCRXV05.75P4	5.7L	6 Speed Manual	RWD	Gasoline	Naturally Aspirated	Port Injection	BIN 160,LEV 160
7	MCRXT06.45P1	6.4L	ZF 8 Speed	AWD	Gasoline	Naturally Aspirated	Port Injection	BIN 160,LEV 160
8	MCRXT03.65P7	3.6L, BSG	ZF 8 Speed	RWD, 4WD	Gasoline	Naturally Aspirated - 2 Step Lift	Port Injection	BIN 70,ULEV 70
9	MCRXT02.05P0	2.0L, ESS	ZF 9 Speed	FWD, AWD, 4WD	Gasoline	Turbocharged	Direct Injection	BIN 70,ULEV70
10	MCRXT05.75P2	5.7L	ZF 8 Speed	RWD, AWD, 4WD	Gasoline	Naturally Aspirated	Port Injection	BIN 125,ULEV125

Figure 1 – MY 2021 Selected Test Groups

2. PEMS Test Routes

FCA performed PEMS testing on private roads at CPG. For each selected vehicle, FCA completed: (1) Steady State PEMS Test (stepped nine-bag); (2) Transient PEMS test; and (3) as requested by EPA and CARB, an 80 MPH Steady State Cruise PEMS Test. FCA’s Steady State and Transient PEMS routes provided for a range of

ambient temperatures and pressures, including conditions not represented on the Federal Test Procedure. Ambient pressures varied depending on elevation at a specific track location and weather conditions. Ambient temperatures varied depending on time of day and weather conditions. FCA performed testing within ambient temperature limits of the PEMS unit provided by the manufacturer and under road conditions to ensure driver safety.

a. Steady State PEMS Test

The Steady State PEMS test is a stepped nine-bag vehicle speed test. The speeds range from 30 to 85 MPH in the following sequence: 30, 50, 60, 65, 70, 65, 75, 80, 85 MPH. Each speed state is held for approximately 600 seconds. The total test is approximately 5400 seconds long without key off or stopping. The Steady State PEMS test was run on FCA’s oval track at CPG.

b. 80 MPH Steady State Cruise PEMS Test

To accommodate the Agencies’ request, FCA performed a 45-minute 80 MPH Steady State Cruise test without key-off or stopping. This 80 MPH Steady State Cruise PEMS test was run on FCA’s oval track at CPG.

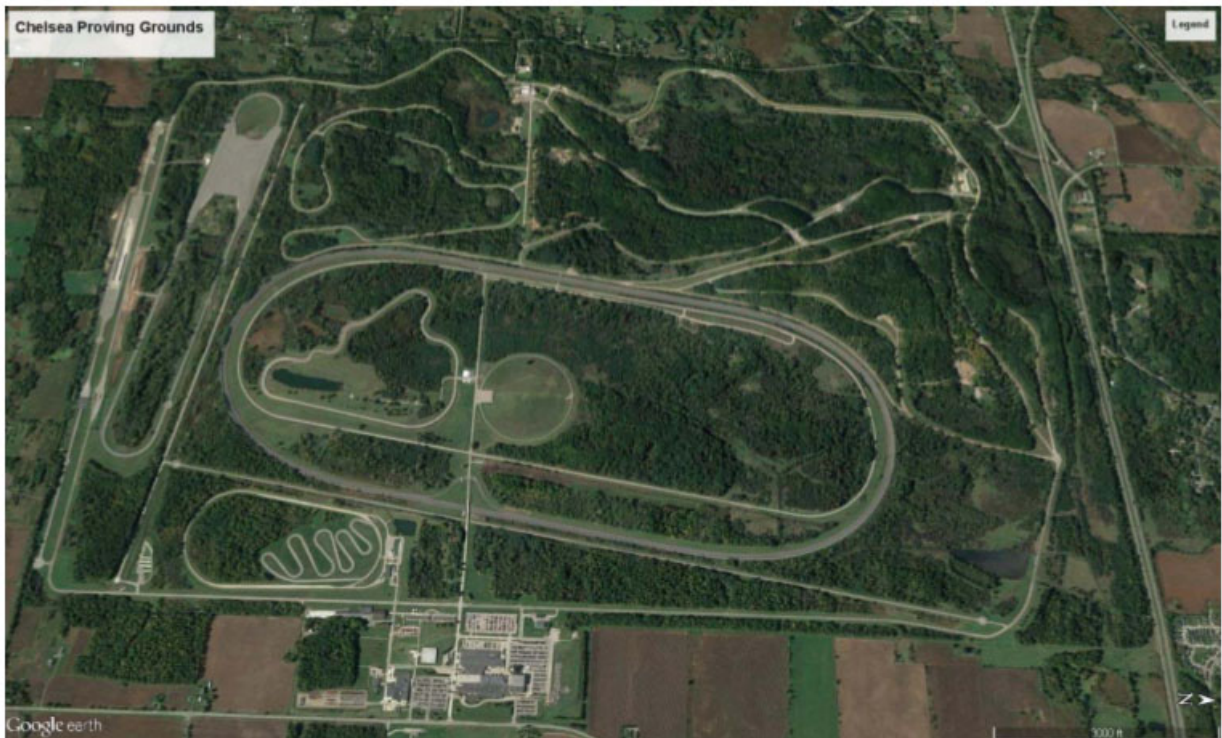


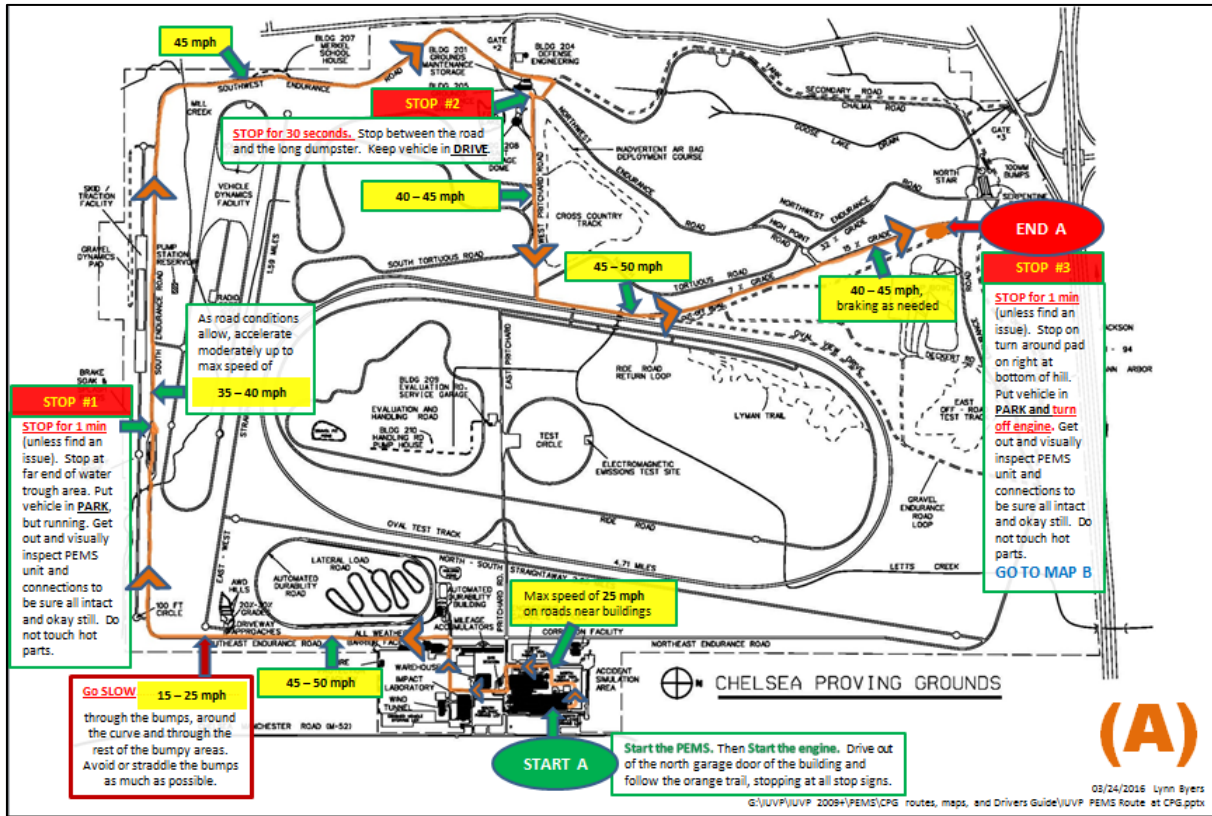
Figure 2 – FCA’s Chelsea Proving Grounds

c. Transient Cycle Test

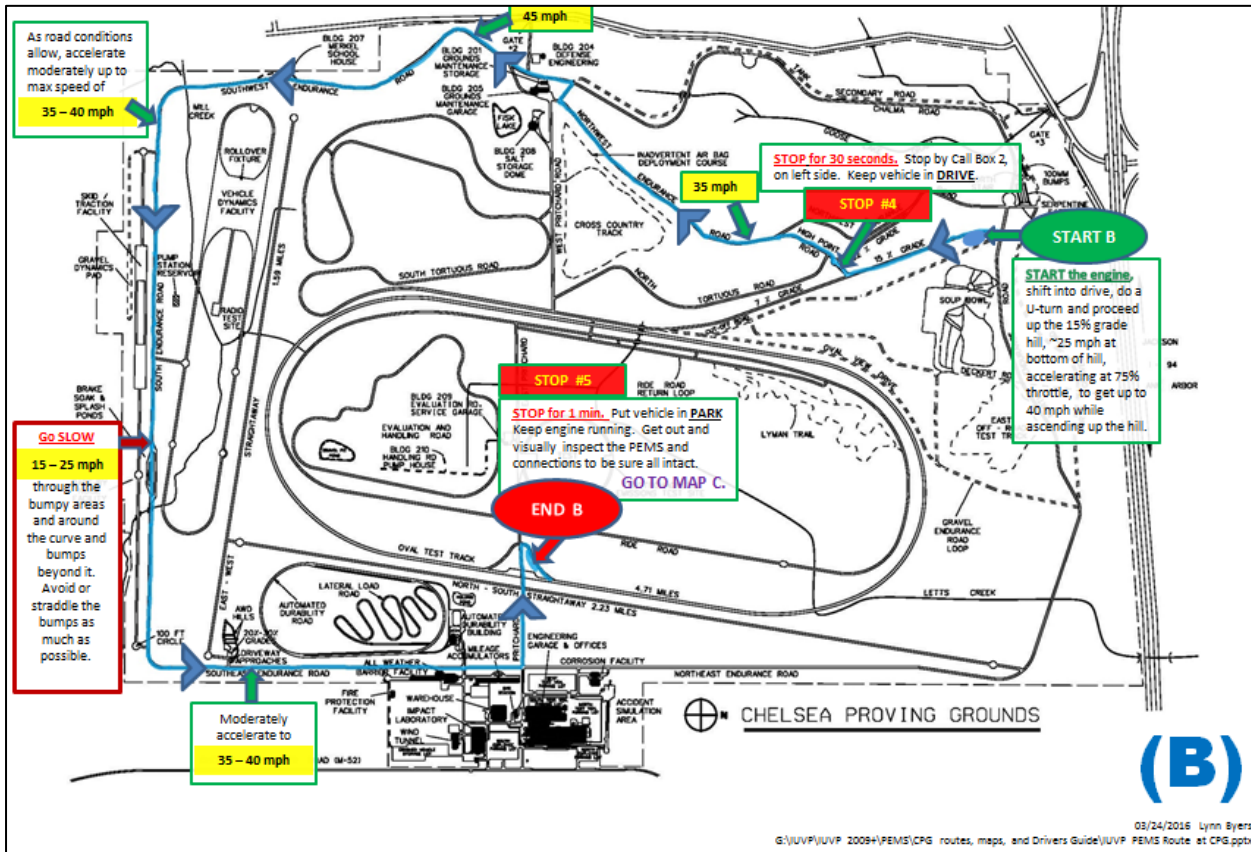
The Transient Cycle route was designed to ensure that there was a mix of endurance, speed, grades and key stops off and on to simulate real world driving conditions. The Transient PEMS test comprised of three portions (outbound, inbound, and oval/end of route) with six total stops, including engine off, and

varying gear states. Speeds range from 0-80 MPH. There are varying grades, undulating and curved roads, and highway driving conditions.

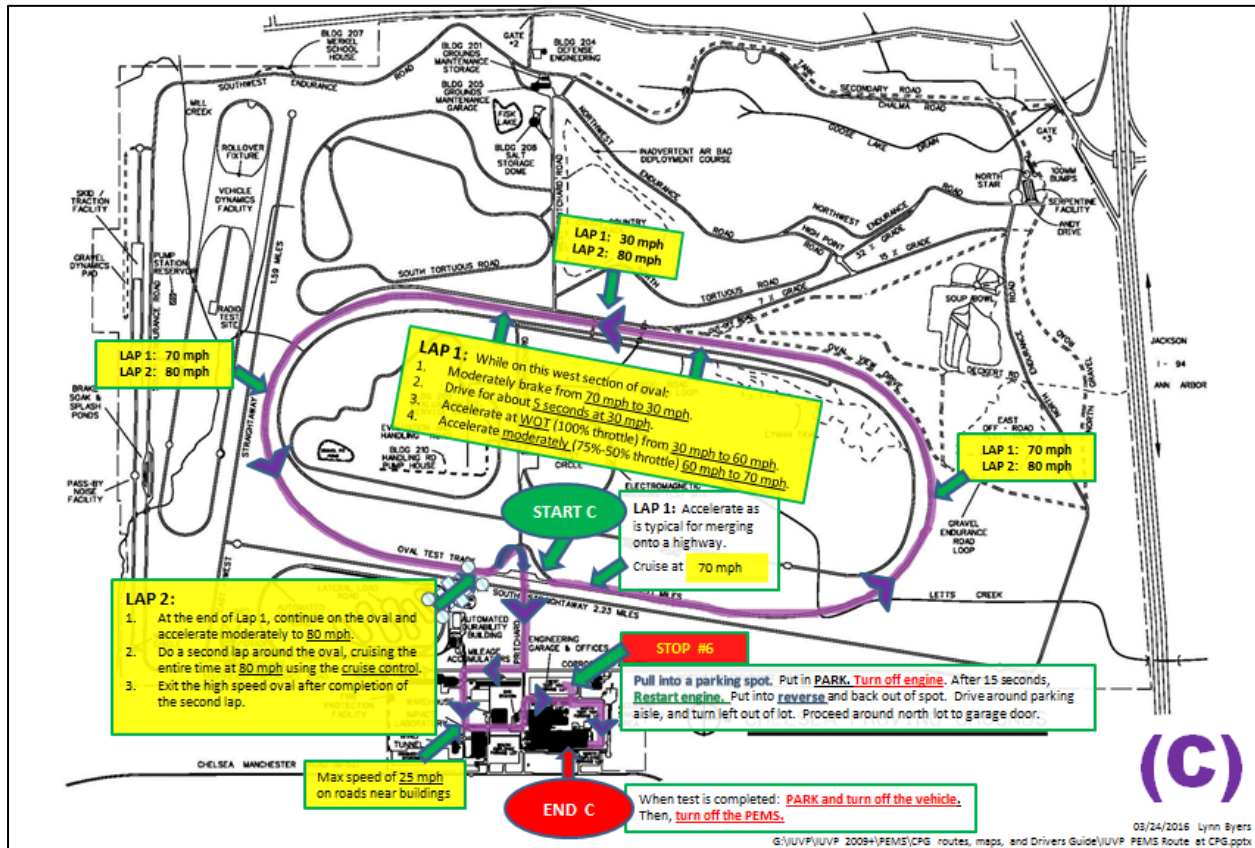
Transient Cycle: Outbound Portion



Transient Cycle: Inbound Portion



Transient Cycle: Oval & End Route



3. Test Methods

a. Vehicle Setup

FCA set the vehicles in the following operation mode for PEMS testing:

- Drive mode: standard drive mode
- A/C adjustment: as appropriate for weather conditions selected by the PEMS driver when driving with the windows closed
- Headlights / daylights: as appropriate for conditions present at the time of testing
- Fuel: certification fuel appropriate for the vehicle being tested
- Weight: curb weight of the vehicle as received plus weight of the driver and PEMS test equipment
- Install permanent Marmon flanges
- Install trailer hitch, if not equipped from the factory
- Inspect vehicle and check fluid levels

b. Correlation

FCA performed weekly correlation testing on the chassis cells with each PEMS unit as a lab quality procedure.

c. PEMS Equipment Installation.

FCA installed PEMS equipment per manufacturer, Sensor, Inc., guidelines.

d. Testing Protocol.

FCA followed the following PEMS test protocol:

i. Pre-Test Preparation

- PEMS requires a minimum of one hour for analyzer warmup and stabilization
- Pre-test routine is performed after warmup (approximately .5 hours), including:
 - System verifications (temperatures and pressures)
 - Leak check
 - Time alignment
 - Exhaust Flow Meter tube purge and pressure zero
 - Zero calibration
 - Span calibration
 - Vehicle Interface communication (CAN data from OBD port)
 - Datafile and recording setup

ii. Conducting the PEMS Test

- **Steady-State PEMS test** is run at nine steady state speeds ranging from 30-85 MPH in the following sequence: 30, 50, 60, 65, 70, 65, 75, 80, 85 MPH. Emissions are collected during the stabilized steady-state plateaus (all transient data was also collected). In total, approximately 600 seconds of data are collected per step.
- **80 MPH Steady State Cruise PEMS test** is a 45-minute steady state cruise at 80 MPH. The total test time is approximately 2700 seconds long without key off or stopping. Emissions are collected during the stabilized steady state cruise (acceleration to 80 MPH at the beginning of the test and deceleration to a stop at the end of the test are also included).

- **Transient Cycle PEMS test** includes six stops, with one engine off stop, and with the remainder of the test as engine running with varying gear state. The speeds range from 0 MPH to 80 MPH and the route includes undulating and curved roads and 7% and 15% grade slopes. The oval track provides highway drive conditions. Refer to the Transient Cycle routes below for complete details.

iii. Post-Test Routine

- Post calibration (zero/span)
- Datafile processing and upload

iv. Emission Data Collection

- Steady-State test has 1 data file that is created during the test (consisting of all 9 vehicle speed steps), emissions data is taken at a 1 Hz sampling rate, and average constituent results are calculated for each vehicle speed step.
- Transient Cycle test has 1 data file that is created during the test, emissions data is taken at a 1 Hz sampling rate, and average constituent results are calculated for the Transient Cycle
- 80 MPH Steady State Cruise has 1 data file that is created during the test, emissions data is taken at a 1 Hz sampling rate, and average constituent results are calculated for the 80 MPH Steady State Cruise.
- As requested by the Agencies, FCA provides cumulative NO_x (g) data as a calculated signal from the second-by-second PEMS data for Paragraph 59.a PEMS testing.
- As requested by the Agencies, relative to all of the second-by-second data for all (available) vehicle, engine, and PEMS parameters identified in Figure 3 of this PEMS Test Plan, data was collected for Paragraph 59.a. PEMS testing by FCA and provided to the Agencies for the entire Steady State PEMS test, Transient PEMS test, and the 80 MPH Steady State test, including the transient portions of the Steady State PEMS test and the 80 MPH Steady State test. As agreed by the Agencies, FCA then post-processed the Steady State PEMS test data and the 80 MPH Steady State test data in order to remove the transient portions from the averages calculated of the constituent pollutants.
- As requested by the Agencies, FCA recorded Engine Coolant Temperature and EGR related OBD PIDS (if equipped) for gasoline and diesel vehicles for Paragraph 59.a PEMS testing.

v. **Test Validation and Data Analysis**

- The datafile was reviewed for any errors or warnings that occurred during testing to determine if the test was valid, including the presence of all requested parameters.
- PEMS Test Engineer also reviewed the datafile for quality purposes after the test was complete.
- Summary tables were created using the following steps for each test.
 - **Steady-State PEMS test** – a Matlab code was created to filter the 9 speed phases of the test and then remove the first and last 30 seconds of each phase to ensure test stabilization and remove transient data; the g/mile values were then calculated with this post processed data.
 - **80 MPH Steady State Cruise PEMS test** – a Matlab code was created to filter the 80 MPH speed points of the test and then remove the first and last 30 seconds of each phase to ensure test stabilization and remove transient data; the g/mile values were then calculated with this post processed data.
 - **Transient Cycle PEMS test** – the post processed PEMS data file was used to calculate the g/mile values. Cumulative emissions for NO_x, CO₂, CO, NMHC and HC were calculated and then divided by the cumulative distance.

4. **List of Available Emission, Vehicle, and Engine Parameters**

As stated in Paragraph 59.c.ii, FCA measured emissions from the following five constituents: NO_x, THC, NMHC, CO, and CO₂. In addition to collecting emissions data for the required five constituents, as well as vehicle speed and percent engine load, FCA collected the following vehicle, engine, environmental and PEMS parameters shown in Figure 3 below from the PEMS test unit or as standard Parameter Identifier (PID) data based on what was available on any given vehicle.

Parameter Description	Parameter Name	Units
DATE	sDATE	mm/dd/yyyy
TIME	sTIME	hh:mm:ss.xxx
Gas Path	sSTATUS_PATH	
Dry-to-Wet Correction Factor	Kw	
NOx Humidity Correction Factor	iCALCRT_Kh	
Heated Line Avg. Duty	AvgDuty	%duty
FlameState	FlameState	
Block Temperature	BlockTemp	degC
Catalyst Temperature	CatalystTemp	degC
Weather Probe Humidity	ISCB_RH	%RH
Ambient Pressure	ISCB_LAP	mbar
Weather Probe Temperature	ISCB_LAT	degC
NOx Humidity Correction Factor	iCALCRT_Kh	
Exhaust Mass Flow Rate	icMASS_FLOW	kg/hr
Exhaust Volumetric Flow Rate - SCFM	EV_std	SCFM
Exhaust Volumetric Flow Rate - l/s (0 deg C referenced)	mEV_std0	l/s
Exhaust Temperature	IFLOW_EX_TEMP	degC
Upstream Pressure	IFLOW_UP_PRESS	kPa
Differential Pressure	IFLOW_SPLINED_PRESS	kPa
No. of DTCs	DTC_CNT	#
Load Percent	IENTG_LOAD	%
Coolant Temp.	ICOOL_TEMP	degF
Engine RPM	IENTG_SPEED	RPM
Vehicle Speed	IVEH_SPEED	mph
Mass Air Flow Rate	IMAF	g/s
Baro. Pressure	BARO	kPa
Control Voltage	VPWR	V
Amb. Air Temp.	AAT	degC
Accel. Postn D	APP_D	%
Accel. Postn E	APP_E	%
Fuel Inj. Timing	FUEL_TIMING	Deg
DD Eng. Pct. Torque	TQ_DD	%
Act. Eng. Pct. Torque	iPCNT_TORQUE	%
Eng. Ref. Torque	sREF_ENG_TORQUE	lb-ft
Cmd. EGR A Duty	EGR_A_CMD	%
Act. EGR A Duty	EGR_A_ACT	%
EGR A Duty Error	EGR_A_ERR	%
EGR Temp. 1-1	EGRTA	degC
Exhaust Press. 1	EP_1	kPa
Exh. Gas Temp. 1-1	EGT11	degC
Exh. Gas Temp. 1-2	EGT12	degC
Exh. Gas Temp. 1-3	EGT13	degC
DPF Delta Press. 1	DPF1_DP	kPa

Figure 3 – FCA Vehicle and Engine Parameters

Parameter Description	Parameter Name	Units
AECD1 Timer 1	AECD1_TIME1	S
AECD1 Timer 2	AECD1_TIME2	S
AECD2 Timer 1	AECD2_TIME1	S
AECD2 Timer 2	AECD2_TIME2	S
AECD3 Timer 1	AECD3_TIME1	S
AECD3 Timer 2	AECD3_TIME2	S
AECD4 Timer 1	AECD4_TIME1	S
AECD4 Timer 2	AECD4_TIME2	S
AECD5 Timer 1	AECD5_TIME1	S
AECD5 Timer 2	AECD5_TIME2	S
AECD6 Timer 1	AECD6_TIME1	S
AECD6 Timer 2	AECD6_TIME2	S
AECD7 Timer 1	AECD7_TIME1	S
AECD7 Timer 2	AECD7_TIME2	S
AECD8 Timer 1	AECD8_TIME1	S
AECD8 Timer 2	AECD8_TIME2	S
AECD9 Timer 1	AECD9_TIME1	S
AECD9 Timer 2	AECD9_TIME2	S
AECD10 Timer 1	AECD10_TIME1	S
AECD10 Timer 2	AECD10_TIME2	S
NOx 1-1	NOX11	ppm
NOx 1-2	NOX12	ppm
Reagent Tank Lvl.	REAG_LVL	%
AECD11 Timer 1	AECD11_TIME1	S
AECD11 Timer 2	AECD11_TIME2	S
AECD12 Timer 1	AECD12_TIME1	S
AECD12 Timer 2	AECD12_TIME2	S
AECD13 Timer 1	AECD13_TIME1	S
AECD13 Timer 2	AECD13_TIME2	S
AECD14 Timer 1	AECD14_TIME1	S
AECD14 Timer 2	AECD14_TIME2	S
AECD15 Timer 1	AECD15_TIME1	S
AECD15 Timer 2	AECD15_TIME2	S
DPF Regen Status	DPF_REG_ST	
Norm. DPF Trig. Pct	DPF_REG_PCT	%
Avg. Time Btwn Rgns	DPF_REG_AVGT	min
Avg. Dist. Btwn Rgns	DPF_REG_AVGD	km
Eng. Frictn Pct, Tq	IFRICT_TORQUE	%
PM Sensor 1-1	PM11	%
Engine Fuel Rate	ENG_FUEL_RATE	g/s
Eng. Exh. Flow Rate	EXH_RATE	kg/hr
Corr. NOx 1-1	NOXC11	ppm
Corr. NOx 1-2	NOXC12	ppm
Cylinder Fuel Rate	CYL_RATE	mg/str

Figure 3 – FCA Vehicle and Engine Parameters (cont.)

Parameter Description	Parameter Name	Units
Vehicle Speed	imVEH_SPEED	km/h
Engine Coolant Temperature	imCOOL_TEMP	deg C
GPS Latitude	iGPS_LAT	Deg
GPS Longitude	iGPS_LON	Deg
GPS Altitude	iGPS_ALT	m
GPS Speed	iGPS_GROUND_SPEED	mph
GPS Ground Speed	imGPS_GROUND_SPEED	km/h
Fuel Rate	iWfgps	gal/s
Instantaneous Fuel Flow	iWf	g/s
Air/Fuel Ratio at stoichiometry	AF_Stoich	
Air/Fuel Ratio of Sample	AF_Calc	
Lambda	Lambda	
Humidity of Exhaust	H2O_exh	%
Sample Temperature	iFEM_SAMPLE_RH_TEMP	degC
Sample Humidity	iFEM_SAMPLE_RH	%RH
Sample Flow	SampFlow	lpm
Water Trap Pressure	WaterTrapPress	kPa
Sample Vacuum	SampleVacuum	kPa
Dryer Inlet Temperature	DryerInTemp	degC
Drain Temperature	DrainTemp	degC
Heated Filter Temperature	HtdFtrTemp	degC
Ambient Temperature	AmbientTemp	degC
Calibration Gas Pressure	CalGasPress	kPa
Heated Line Avg. Duty	AvgDuty	%duty
AMB Ambient Temperature	AmbTemp	degC
AMB Pressure	float.AMB_Pressure	mbar
AMB Lamp Temperature	LampTemp	degC
Detector Temperature	DetectorTemp	degC
NDUV Temperature	iNDUV_BT1	degC
NDUV Pressure	iNDUV_PRESSURE	kPa
Gas Analyzer Enclosure Temperature	NOXCaseTemp	degC
Status	Status	
Faults	Faults	
Gas Analyzer Current	GASCurrent	A
Exhaust Flow Meter Current	EFMCurrent	A
Sample Conditioning System Current	SCSCurrent	A
Heated Line Current	HTLCurrent	A
Auxiliary 1 Current	Aux1Current	A
Auxiliary 2 Current	Aux2Current	A
Auxiliary 3 Current	Aux3Current	A
Microcontroller Current	McuCurrent	A
Ethernet Switch Current	EthernetCurrent	A
Cab Module Current	CabModuleCurrent	A
Wireless AP Current	WiFiCurrent	A
Battery 1 Current	Batt1Current	A
Battery 2 Current	Batt2Current	A
Total Current	TotalCurrent	A
Battery 1 Voltage	Batt1Voltage	V
Battery 2 Voltage	Batt2Voltage	V
DC Rail Voltage	DCRailVoltage	V
Max. Input Voltage	MaxInputVoltage	V
Min. Input Voltage	MinInputVoltage	V
Amp Hours Consumed From Input 1	AmpHoursConsumedInput1	AH
Amp Hours Consumed From Input 2	AmpHoursConsumedInput2	AH
Catalyst Temperature	CatalystTemp	degC

Figure 3 – FCA Vehicle and Engine Parameters (cont.)

IV. Results

The following tables and figures summarize the PEMS emissions data. Each vehicle was driven on each test route at least once. In certain circumstances, a vehicle route may have been repeated. However, when a test was deemed invalid due to missing or improper PID channels requested by the Agencies (Vehicles 8 and 10) or inaccurate PEMS unit calibration due to possible water contamination during the pre or post calibration process (Vehicle 5), data from that invalid test were not included in the results below.

1. **Vehicle 1 – MCRXT03.65P5 – V1WDD3575** **3.6L Dodge Durango GT RWD**

a. **Summary Table(s)**

Steady State	NOx (g/mi)	CO2 (g/mi)	CO (g/mi)	NMHC (g/mi)	HC (g/mi)
30	0.0049	187.9237	0.0000	0.0011	0.0012
50	0.0110	224.9323	0.0135	0.0021	0.0030
60	0.0138	240.4563	0.0110	0.0023	0.0050
65	0.0162	261.2222	0.0362	0.0032	0.0077
70	0.0178	282.4949	0.0921	0.0151	0.0234
65	0.0166	264.3616	0.0628	0.0097	0.0173
75	0.0196	317.3812	0.2222	0.0230	0.0401
80	0.0215	342.0469	0.2750	0.0147	0.0320
85	0.0235	372.6245	0.2883	0.0090	0.0237

Table 1.1: Vehicle 1 – Steady State
File: V1WDD3575_SSPEMS010221030580.pems.csv

80 MPH Steady State Cruise	NOx (g/mi)	CO2 (g/mi)	CO (g/mi)	NMHC (g/mi)	HC (g/mi)
80	0.0123	323.5479	0.1310	0.0117	0.0200

Table 1.2: Vehicle 1 – 80 MPH Steady State Cruise
File: V1WDD3575_80SS45010321030480.pems.csv

Transient Cycle	NOx (g/mi)	CO2 (g/mi)	CO (g/mi)	NMHC (g/mi)	HC (g/mi)
Various	0.0141	344.7560	2.9445	0.0206	0.0334

Table 1.3: Vehicle 1 – Transient Cycle
File: V1WDD3575_P-IUVP010221030480.pems.csv

b. Summary Plot(s)

i. Steady State PEMS Test

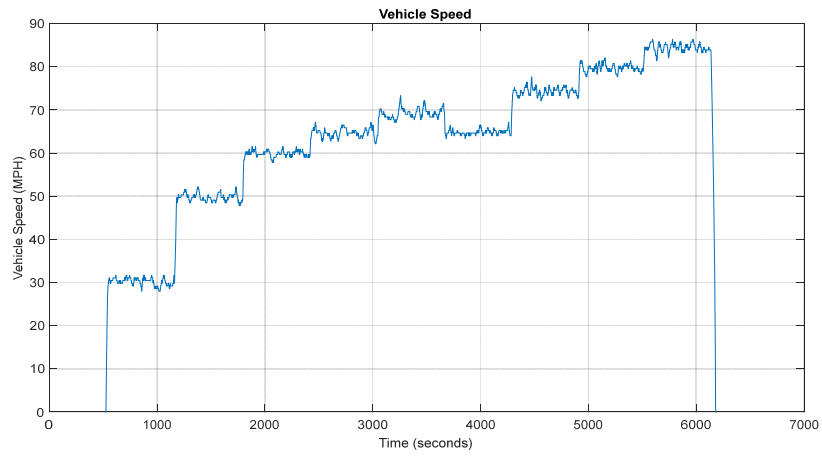


Figure 1.1.1: Vehicle 1 – Steady State Vehicle Speed

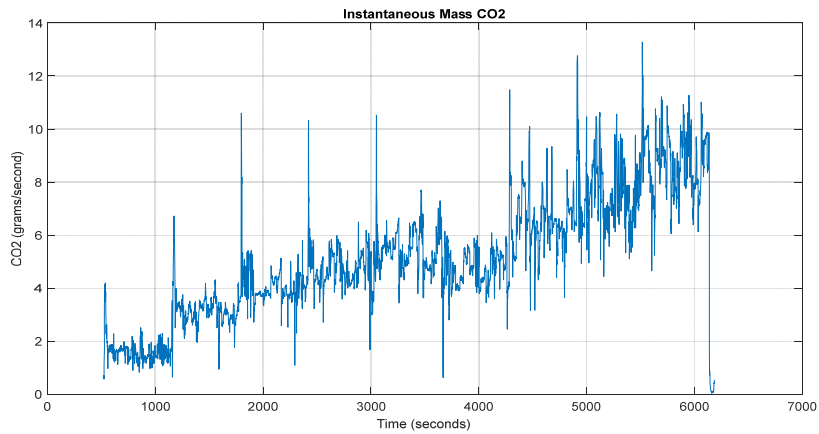


Figure 1.1.2: Vehicle 1 – Vehicle 1 – Steady State Instantaneous Mass CO2

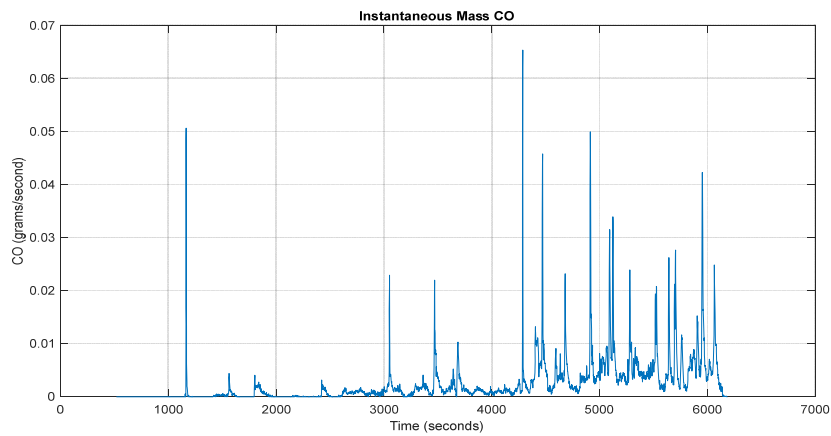


Figure 1.1.3: Vehicle 1 – Steady State Instantaneous Mass CO

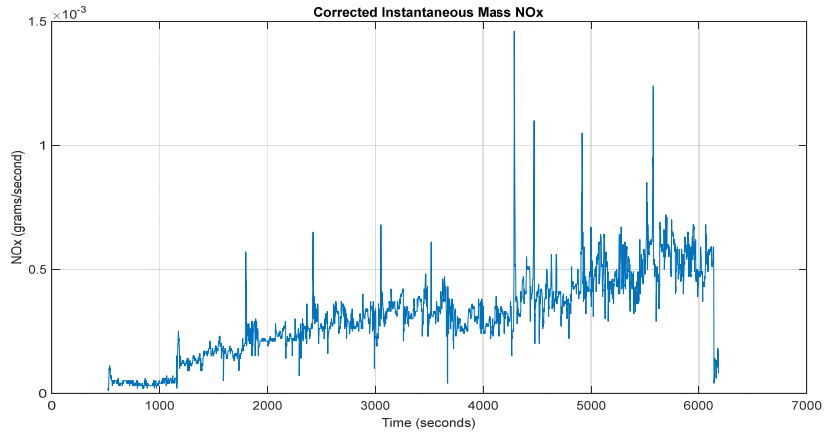


Figure 1.1.4: Vehicle 1 – Steady State Corrected Instantaneous Mass NOx

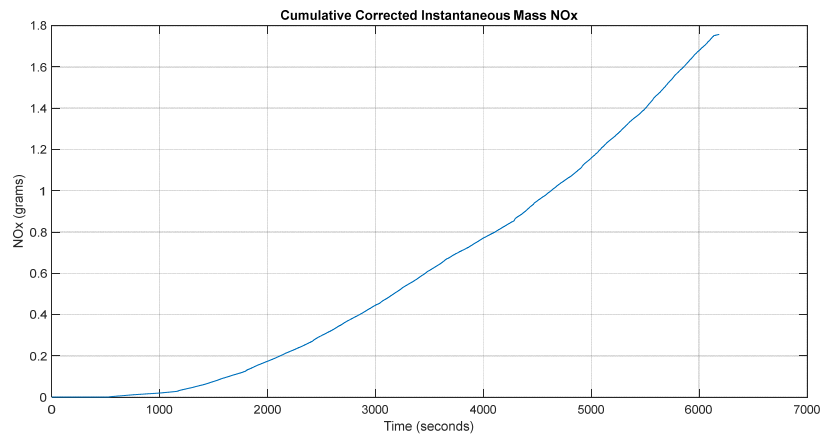


Figure 1.1.5: Vehicle 1 – Steady State Cumulative Corrected Instantaneous Mass NOx

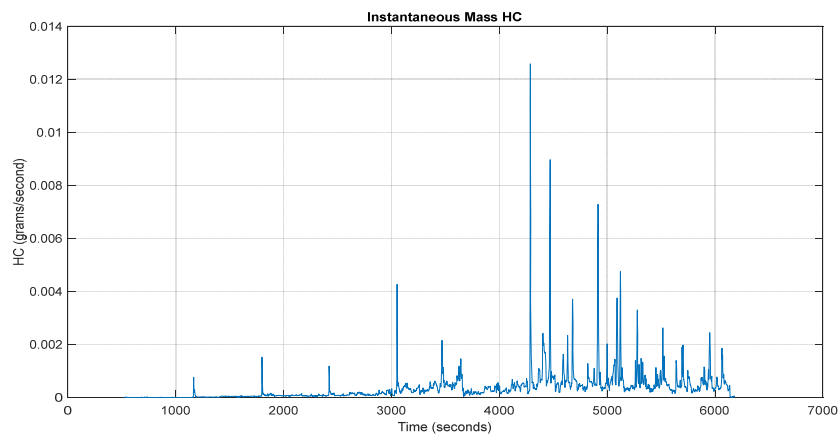


Figure 1.1.6: Vehicle 1 – Steady State Instantaneous Mass HC

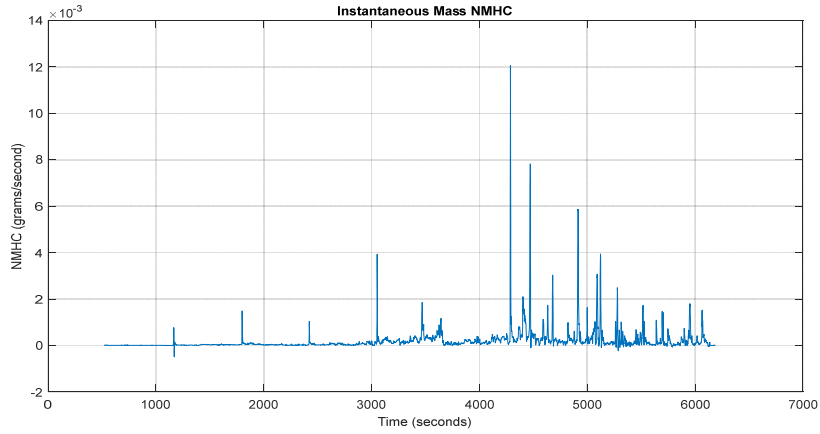


Figure 1.1.7: Vehicle 1 – Steady State Instantaneous Mass NMHC

ii. 80 MPH Steady State Cruise PEMS Test

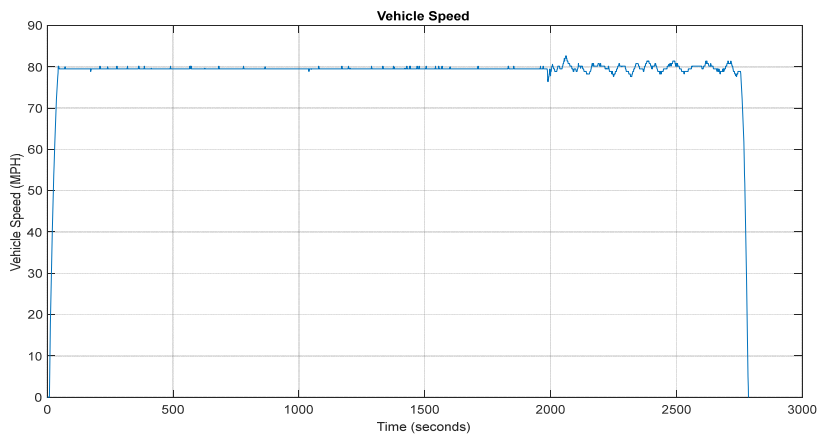


Figure 1.2.1: Vehicle 1 – 80 MPH Steady State Cruise Vehicle Speed

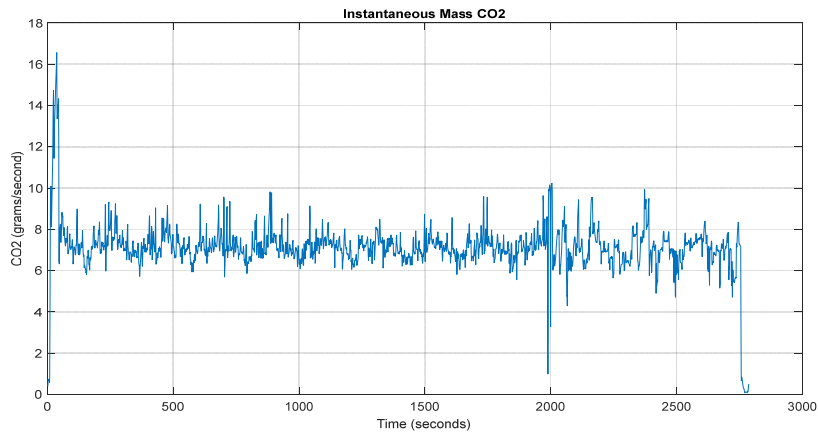


Figure 1.2.2: Vehicle 1 – 80 MPH Steady State Cruise Instantaneous Mass CO2

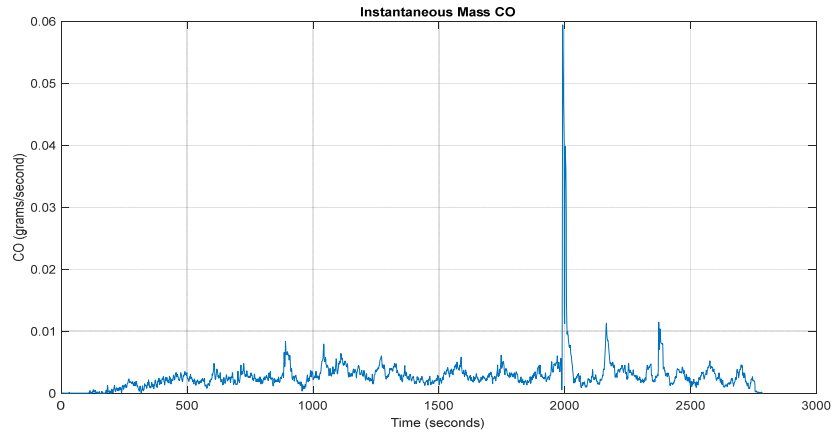


Figure 1.2.3: Vehicle 1 – 80 MPH Steady State Cruise Instantaneous Mass CO

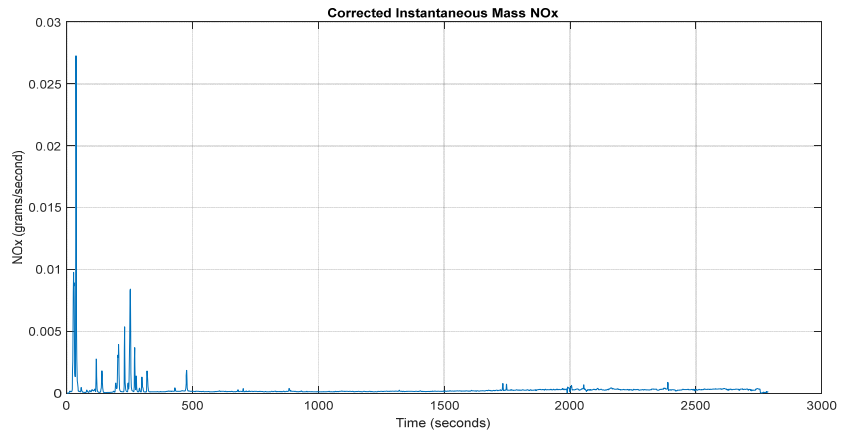


Figure 1.2.4: Vehicle 1 – 80 MPH Steady State Cruise Corrected Instantaneous Mass NOx

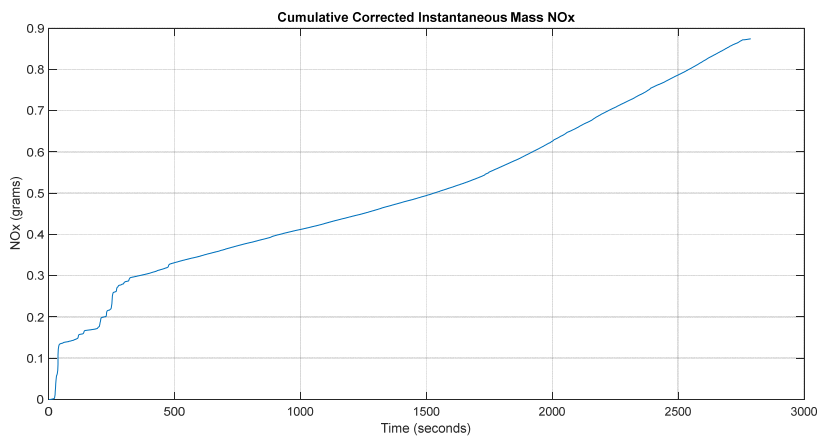


Figure 1.2.5: Vehicle 1 – 80 MPH Steady State Cruise Cumulative Corrected Instantaneous Mass NOx

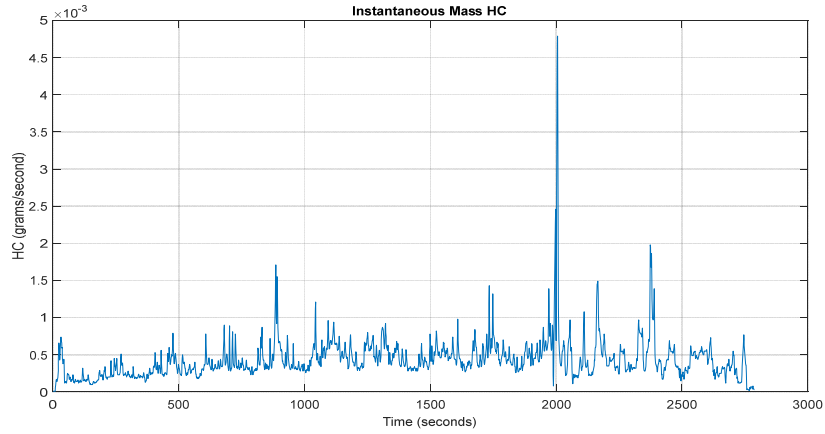


Figure 1.2.6: Vehicle 1 – 80 MPH Steady State Cruise Instantaneous Mass HC

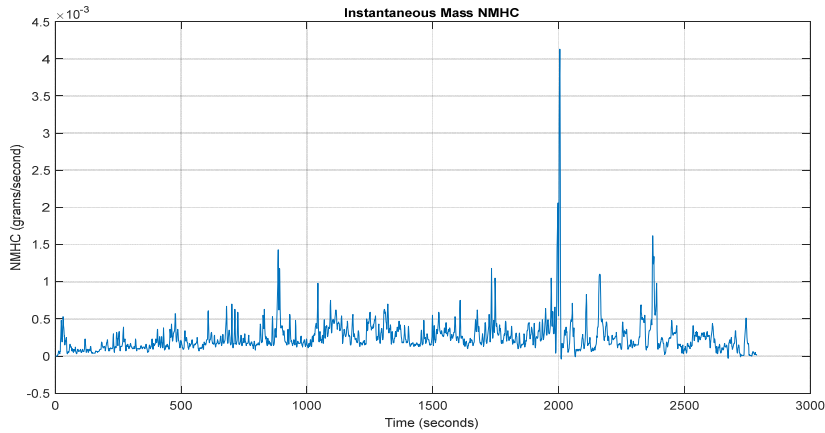


Figure 1.2.7: Vehicle 1 – 80 MPH Steady State Cruise Instantaneous Mass NMHC

iii. Transient Cycle PEMS Test

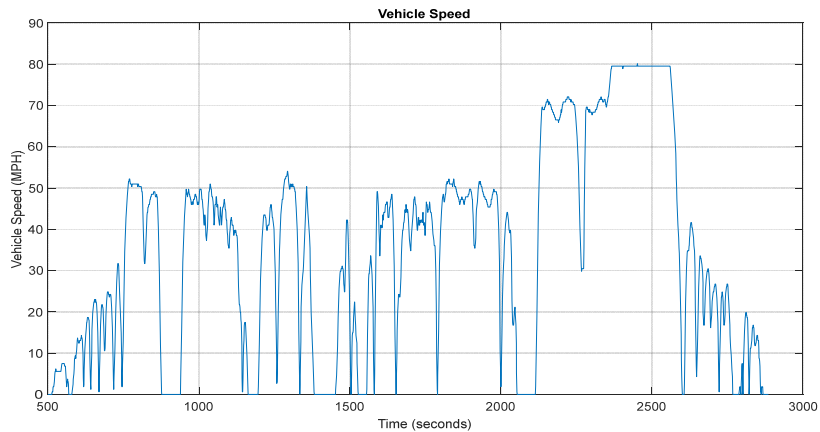


Figure 1.3.1: Vehicle 1 – Transient Cycle Vehicle Speed

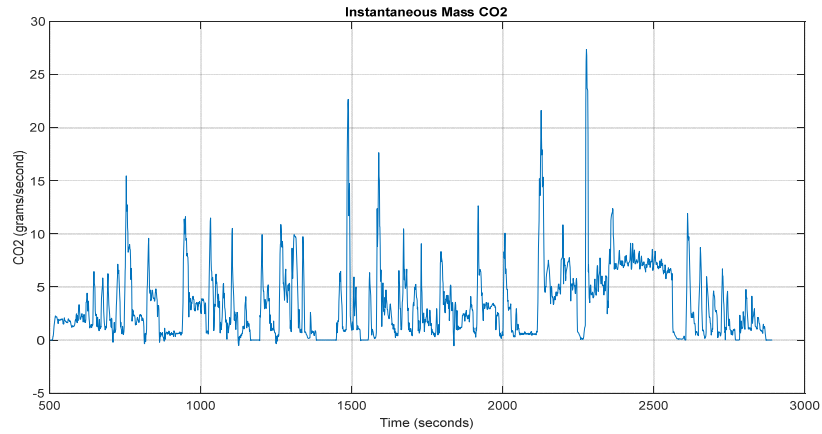


Figure 1.3.2: Vehicle 1 – Transient Cycle Instantaneous Mass CO2

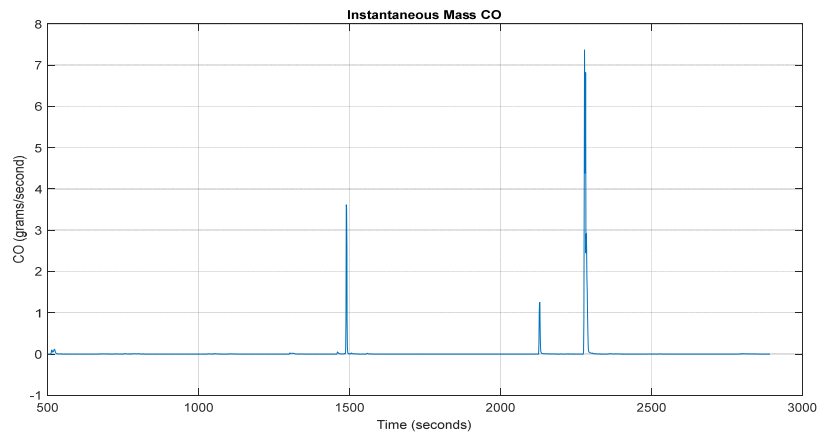


Figure 1.3.3: Vehicle 1 – Transient Cycle Instantaneous Mass CO

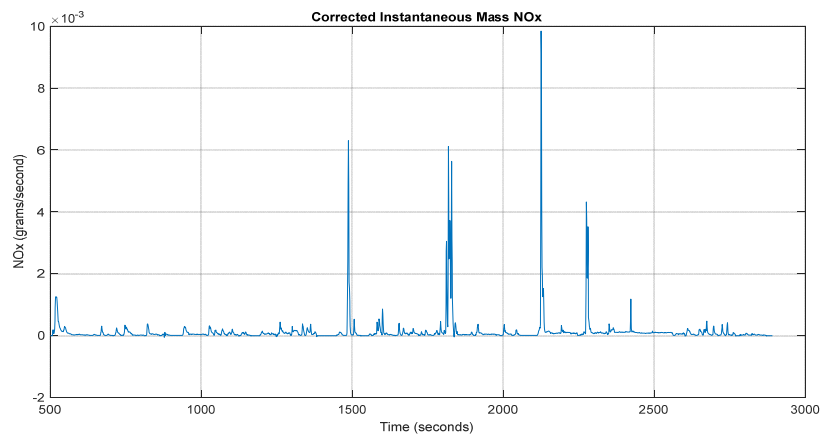


Figure 1.3.4: Vehicle 1 – Transient Cycle Corrected Instantaneous Mass NOx

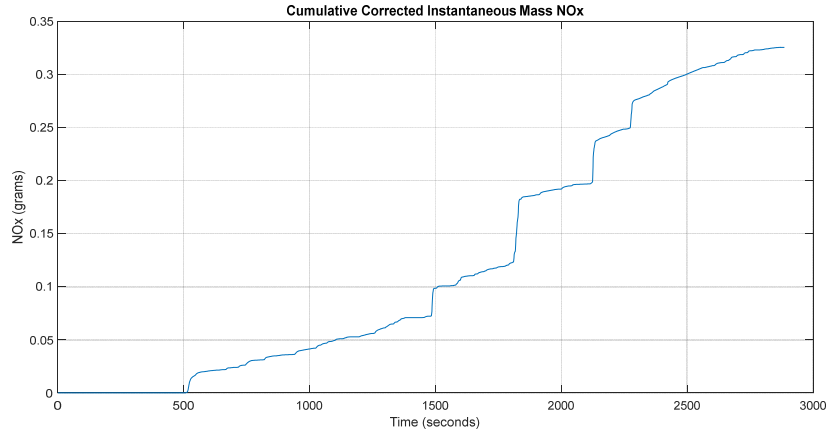


Figure 1.3.5: Vehicle 1 – Transient Cycle Cumulative Corrected Instantaneous Mass NOx

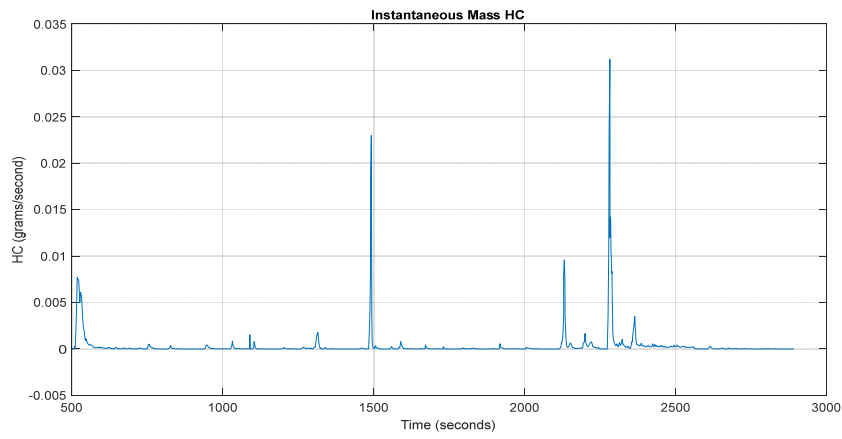


Figure 1.3.6: Vehicle 1 – Transient Cycle Instantaneous Mass HC

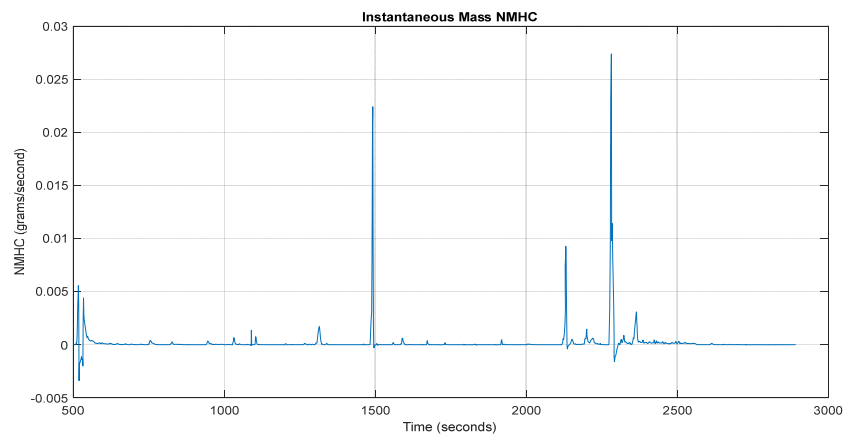


Figure 1.3.7: Vehicle 1 – Transient Cycle Instantaneous Mass NMHC

**2. Vehicle 2 – MCRXT03.05PW – V1DT65364
3.0L RAM 1500 Rebel Crew 4X4**

a. Summary Table(s)

Steady State	NOx (g/mi)	CO2 (g/mi)	CO (g/mi)	NMHC (g/mi)	HC (g/mi)
30	0.0006	244.8453	0.0538	0.0021	0.0120
50	0.0009	322.1963	0.0856	0.0004	0.0011
60	0.0023	380.0790	0.0897	-0.0011	0.0004
65	0.0052	416.3948	0.2160	-0.0016	0.0009
70	0.0074	447.9444	0.2341	0.0004	0.0033
65	0.0071	414.2813	0.2099	0.0010	0.0036
75	0.0098	491.1220	0.1579	0.0012	0.0049
80	0.0128	537.8819	0.1123	0.0010	0.0058
85	0.0148	595.5191	0.0865	0.0009	0.0064

Table 2.1: Vehicle 2 – Steady State
File: V1DT65364_SSPEMS010521031980.pems.csv

80 MPH Steady State Cruise	NOx (g/mi)	CO2 (g/mi)	CO (g/mi)	NMHC (g/mi)	HC (g/mi)
80	0.0140	551.0557	0.1458	0.0001	0.0078

Table 2.2: Vehicle 2 – 80 MPH Steady State Cruise
File: V1DT65364_80SS45010321031980.pems.csv

Transient Cycle	NOx (g/mi)	CO2 (g/mi)	CO (g/mi)	NMHC (g/mi)	HC (g/mi)
Various	0.0570	495.8627	0.4072	0.0128	0.0191

Table 2.3: Vehicle 2 – Transient Cycle
File: V1DT65364_P-IUVP010421031980.pems.csv

b. Summary Plot(s)
i. Steady State PEMS Test

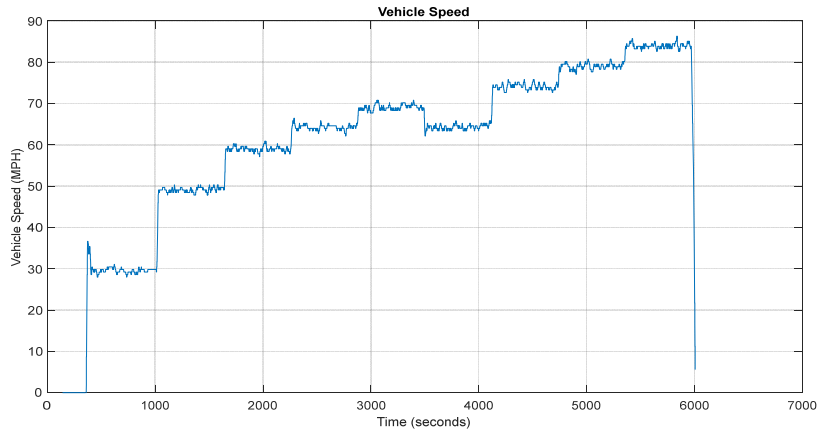


Figure 2.1.1: Vehicle 2 – Steady State Vehicle Speed

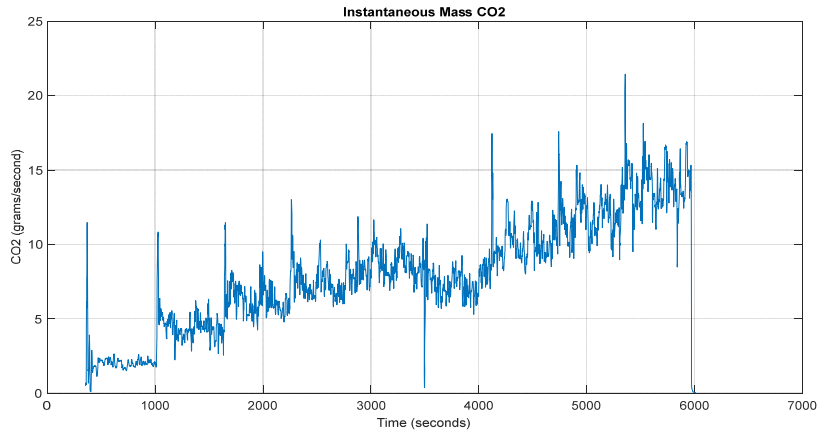


Figure 2.1.2: Vehicle 2 – Steady State Instantaneous Mass CO2

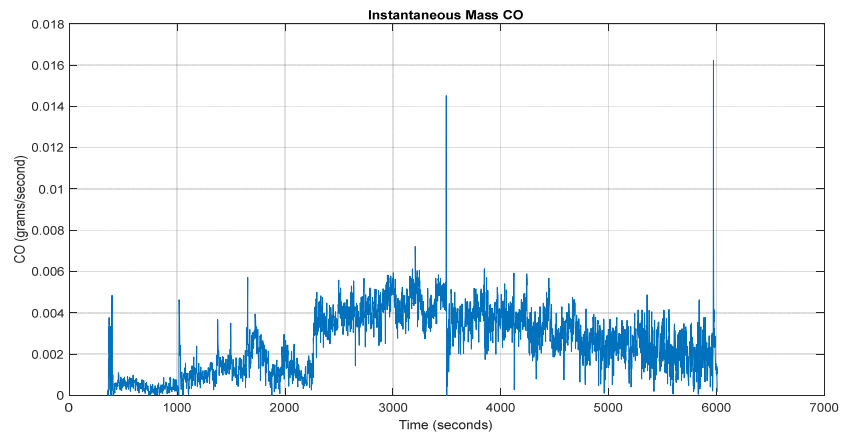


Figure 2.1.3: Vehicle 2 – Steady State Instantaneous Mass CO

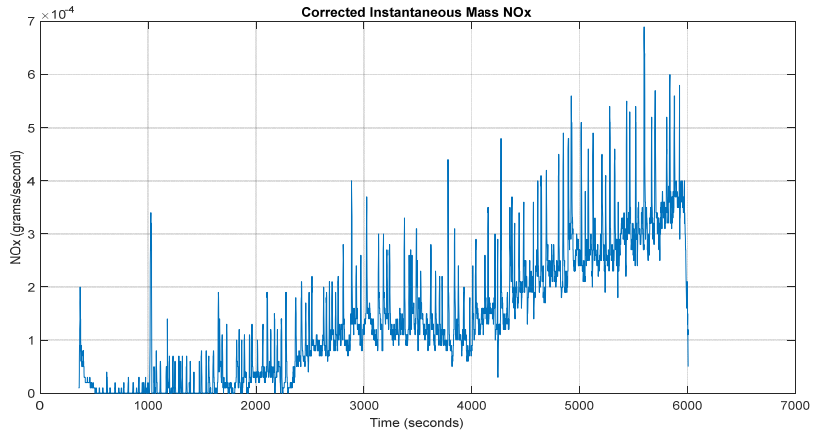


Figure 2.1.4: Vehicle 2 – Steady State Corrected Instantaneous Mass NOx

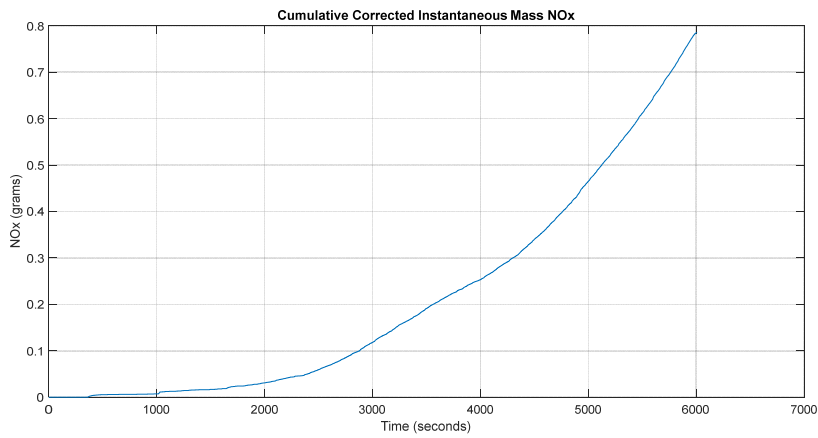


Figure 2.1.5: Vehicle 2 – Steady State Cumulative Corrected Instantaneous Mass NOx

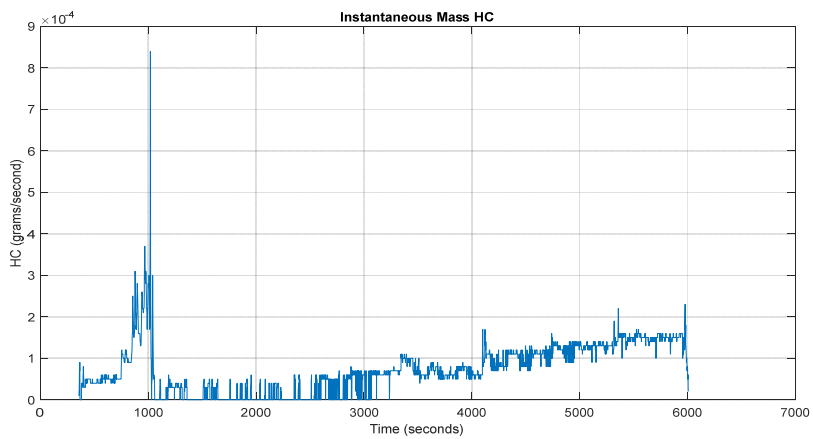


Figure 2.1.6: Vehicle 2 – Steady State Instantaneous Mass HC

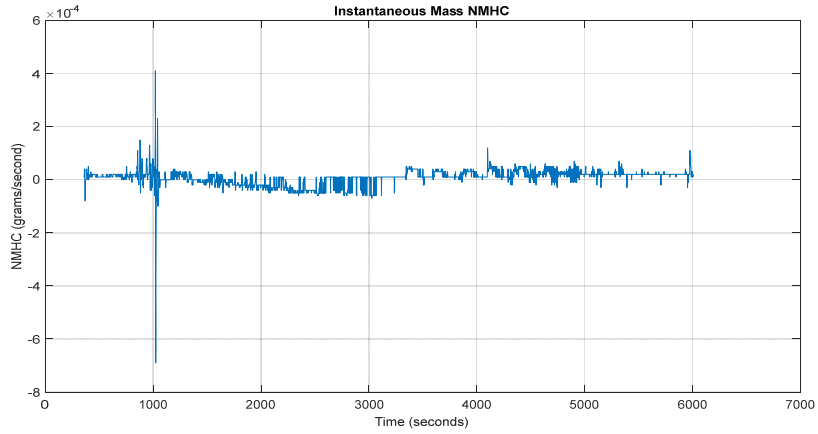


Figure 2.1.7: Vehicle 2 – Steady State Instantaneous Mass NMHC

ii. 80 MPH Steady State Cruise PEMS Test

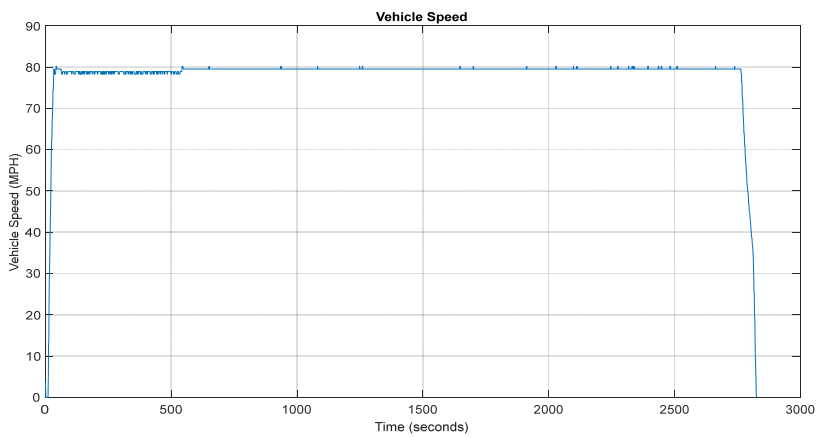


Figure 2.2.1: Vehicle 2 – 80 MPH Steady State Cruise Vehicle Speed

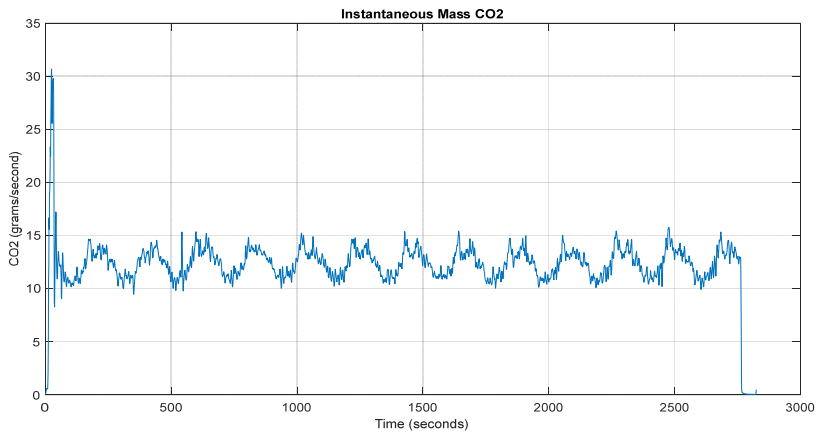


Figure 2.2.2: Vehicle 2 – 80 MPH Steady State Cruise Instantaneous Mass CO₂

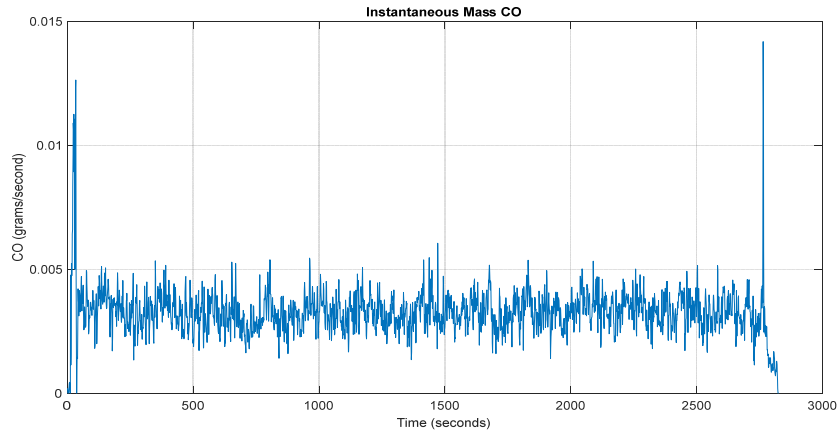


Figure 2.2.3: Vehicle 2 – 80 MPH Steady State Cruise Instantaneous Mass CO

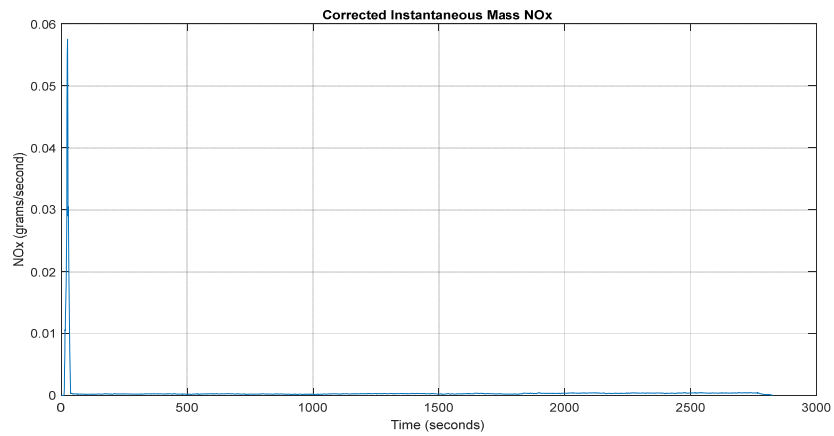


Figure 2.2.4: Vehicle 2 – 80 MPH Steady State Cruise Corrected Instantaneous Mass NOx

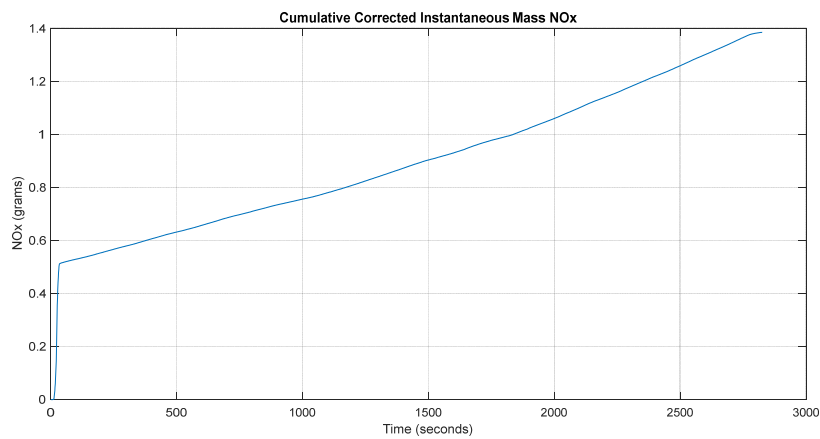


Figure 2.2.5: Vehicle 2 – 80 MPH Steady State Cruise Cumulative Corrected Instantaneous Mass NOx

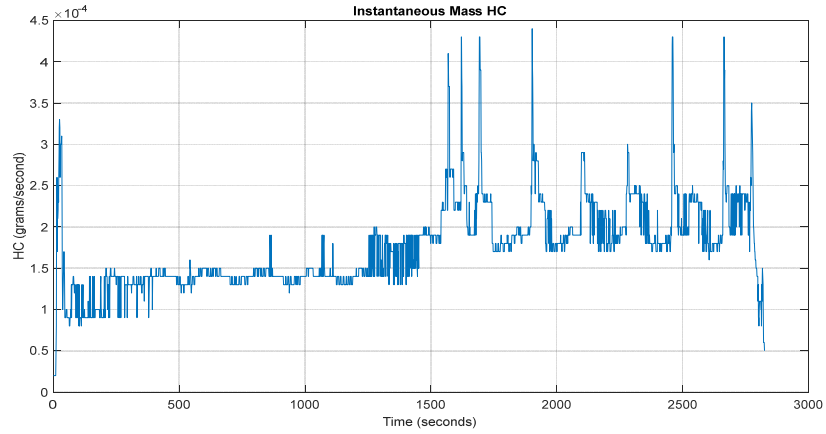


Figure 2.2.6: Vehicle 2 – 80 MPH Steady State Cruise Instantaneous Mass HC

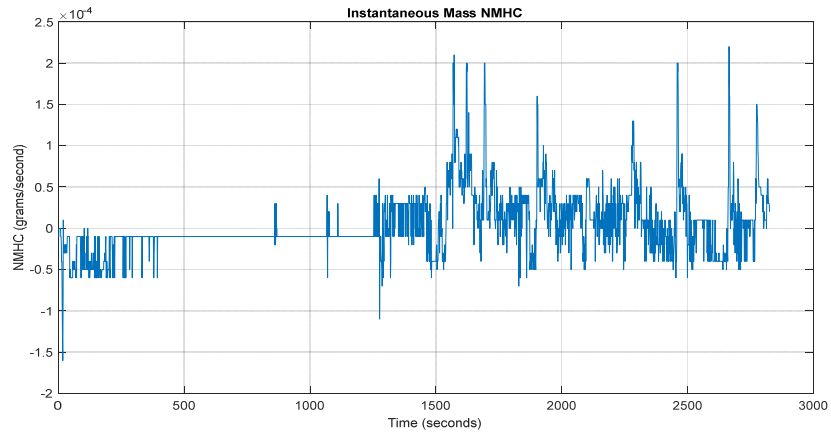


Figure 2.2.7: Vehicle 2 – 80 MPH Steady State Cruise Instantaneous Mass NMHC

iii. Transient Cycle PEMS Test



Figure 2.3.1: Vehicle 2 – Transient Cycle Vehicle Speed

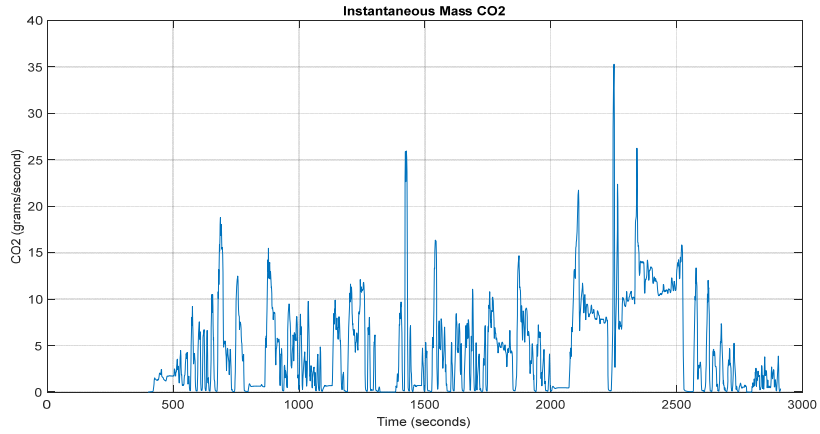


Figure 2.3.2: Vehicle 2 – Transient Cycle Instantaneous Mass CO2

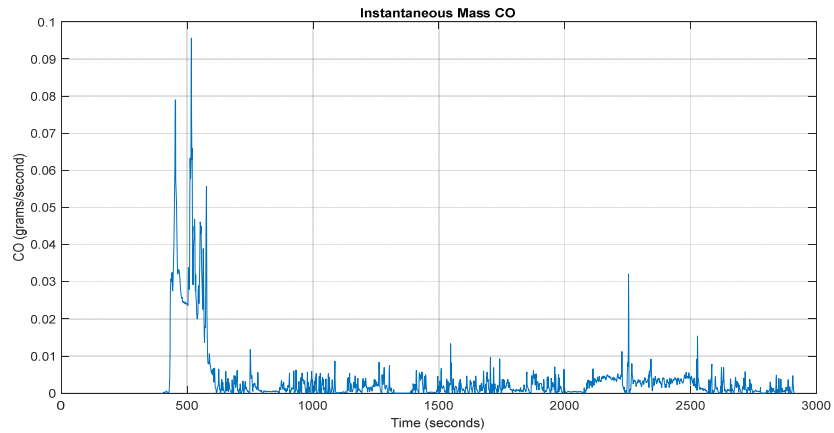


Figure 2.3.3: Vehicle 2 – Transient Cycle Instantaneous Mass CO

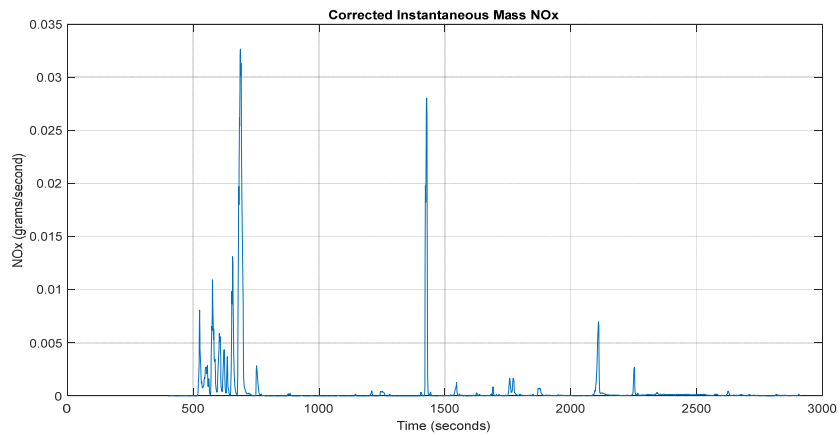


Figure 2.3.4: Vehicle 2 – Transient Cycle Corrected Instantaneous Mass NOx

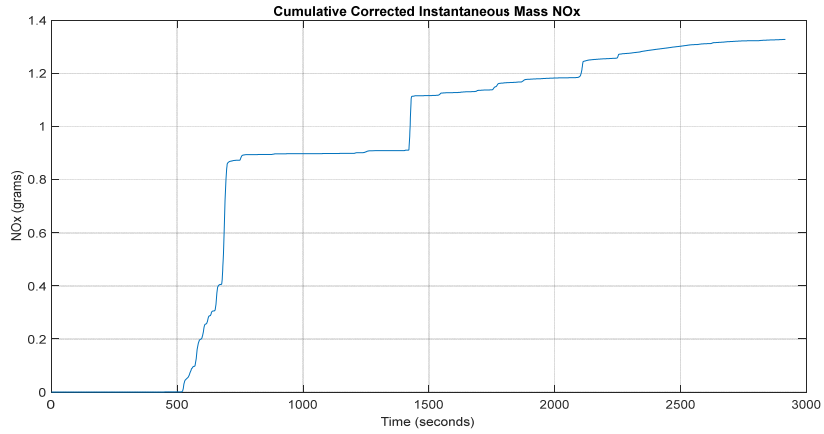


Figure 2.3.5: Vehicle 2 – Transient Cycle Cumulative Corrected Instantaneous Mass NOx

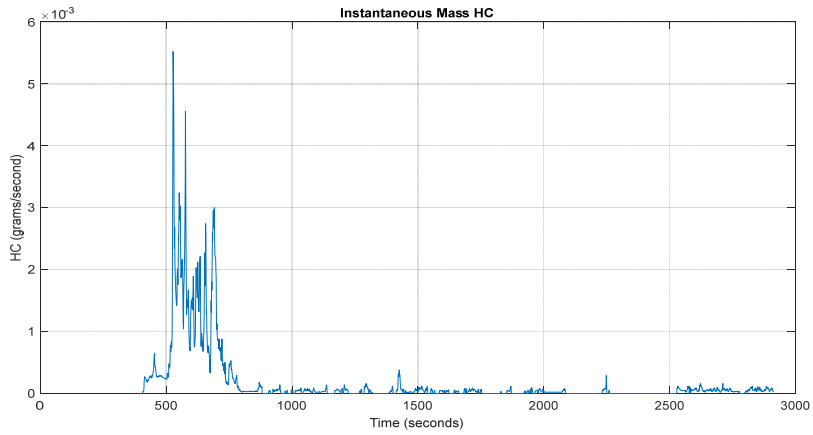


Figure 2.3.6: Vehicle 2 – Transient Cycle Instantaneous Mass HC

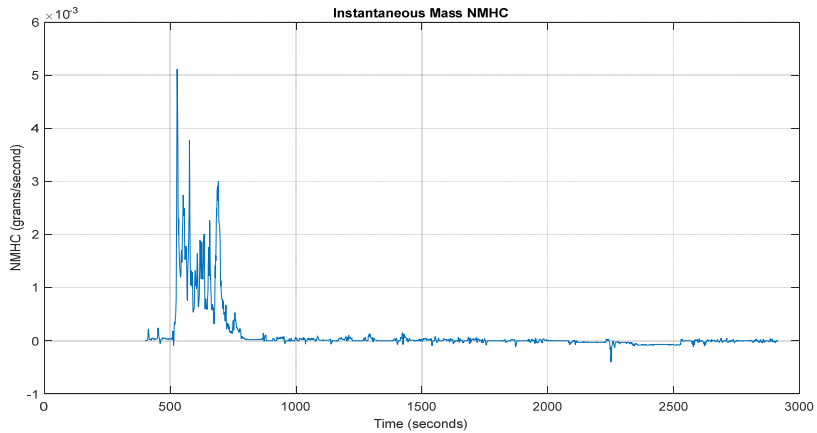


Figure 2.3.7: Vehicle 2 – Transient Cycle Instantaneous Mass NMHC

**3. Vehicle 3 – MCRXV05.75P3 – V1LXC4068
5.7L Chrysler 300 RWD**

a. Summary Table(s)

Steady State	NOx (g/mi)	CO2 (g/mi)	CO (g/mi)	NMHC (g/mi)	HC (g/mi)
30	0.0004	317.0354	0.1027	0.0004	0.0004
50	0.0000	298.2674	0.1466	0.0033	0.0062
60	0.0061	328.5499	0.5592	0.0187	0.0362
65	0.0095	370.2047	0.5627	0.0158	0.0284
70	0.0047	367.7727	0.0971	0.0003	0.0034
65	0.0044	360.9442	0.1945	0.0023	0.0078
75	0.0084	396.1157	0.2683	0.0015	0.0083
80	0.0467	414.1620	0.1562	-0.0003	0.0047
85	0.0957	441.1151	0.1580	-0.0005	0.0045

**Table 3.1: Vehicle 3 – Steady State
File: V1LXC4068_SSPEMS010121041780.pems.csv**

80 MPH Steady State Cruise	NOx (g/mi)	CO2 (g/mi)	CO (g/mi)	NMHC (g/mi)	HC (g/mi)
80	0.0644	404.9617	0.2074	0.0027	0.0046

**Table 3.2: Vehicle 3 – 80 MPH Steady State Cruise
File: V1LXC4068_80SS45010221041980.pems.csv**

Transient Cycle	NOx (g/mi)	CO2 (g/mi)	CO (g/mi)	NMHC (g/mi)	HC (g/mi)
Various	0.0191	499.8788	4.2404	0.0159	0.0389

**Table 3.3: Vehicle 3 – Transient Cycle
File: V1LXC4068_P-IUVP010121041980.pems.csv**

b. Summary Plot(s)
i. Steady State PEMS Test

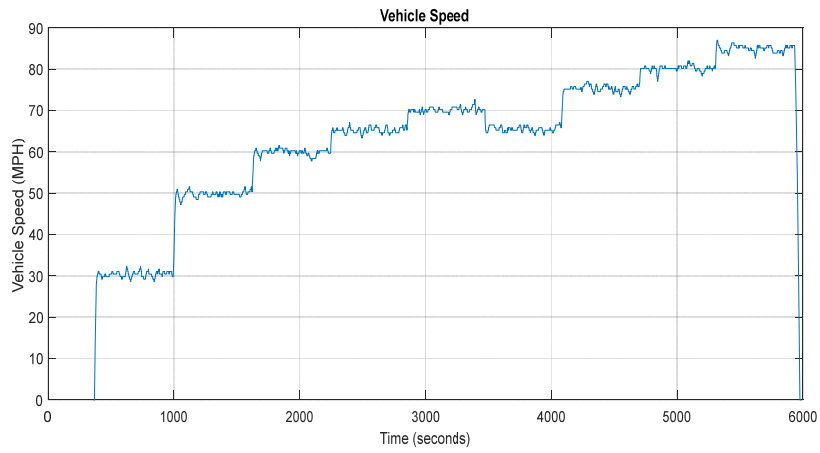


Figure 3.1.1: Vehicle 3 – Steady State Vehicle Speed

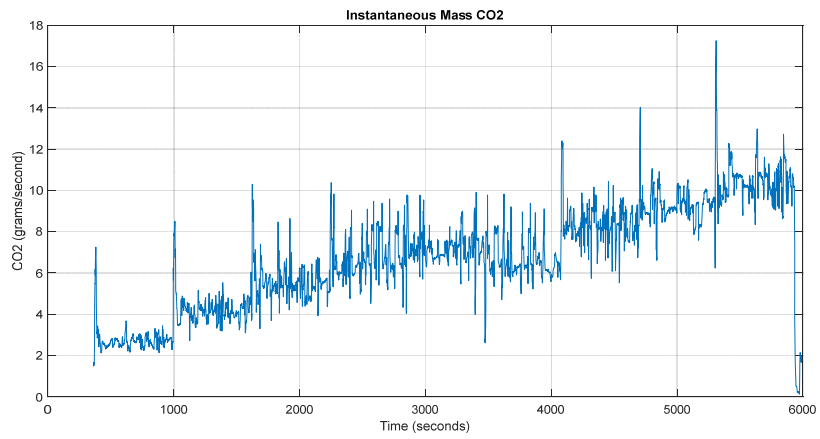


Figure 3.1.2: Vehicle 3 – Steady State Instantaneous Mass CO2

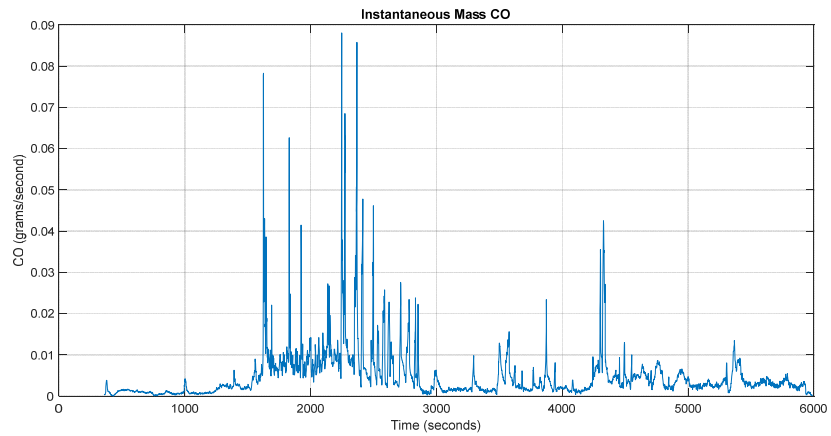


Figure 3.1.3: Vehicle 3 – Steady State Instantaneous Mass CO

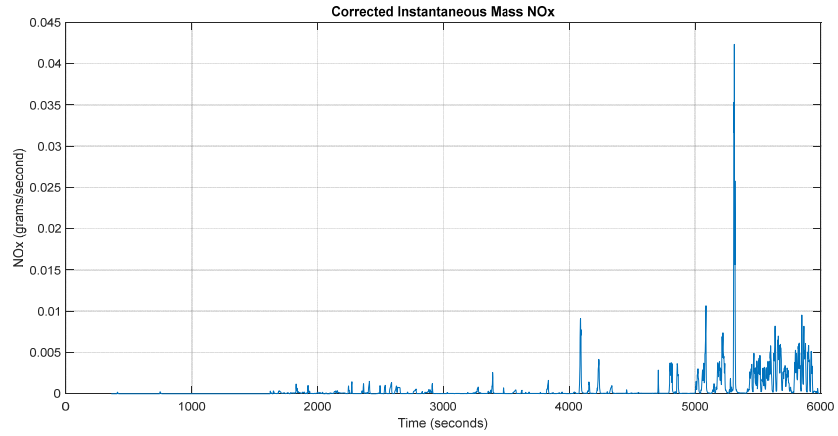


Figure 3.1.4: Vehicle 3 – Steady State Corrected Instantaneous Mass NOx

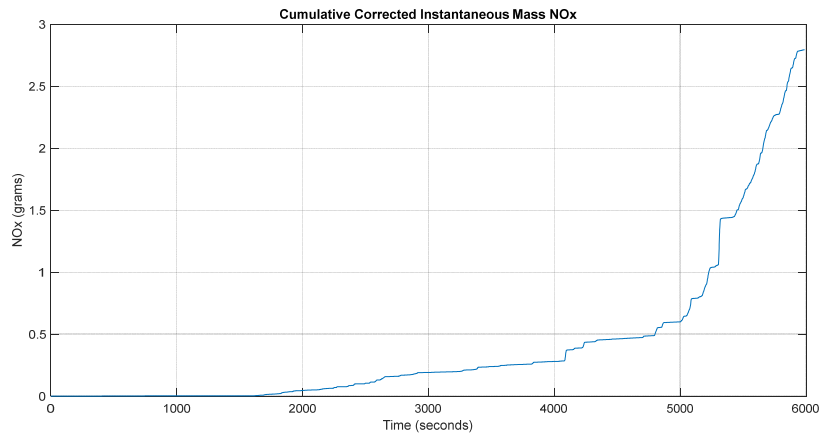


Figure 3.1.5: Vehicle 3 – Steady State Cumulative Corrected Instantaneous Mass NOx

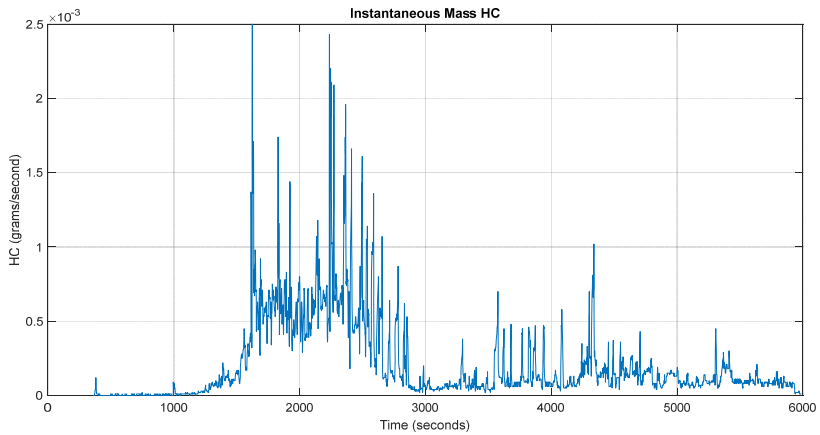


Figure 3.1.6: Vehicle 3 – Steady State Instantaneous Mass HC

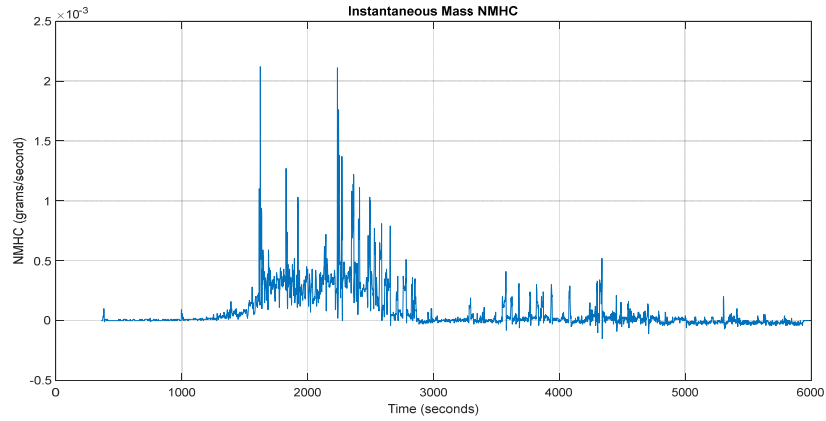


Figure 3.1.7: Vehicle 3 – Steady State Instantaneous Mass NMHC

ii. 80 MPH Steady State Cruise PEMS Test

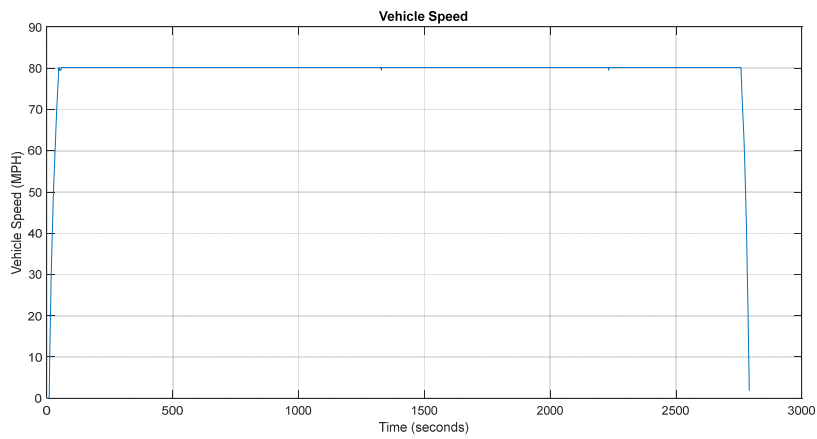


Figure 3.2.1: Vehicle 3 – 80 MPH Steady State Cruise Vehicle Speed

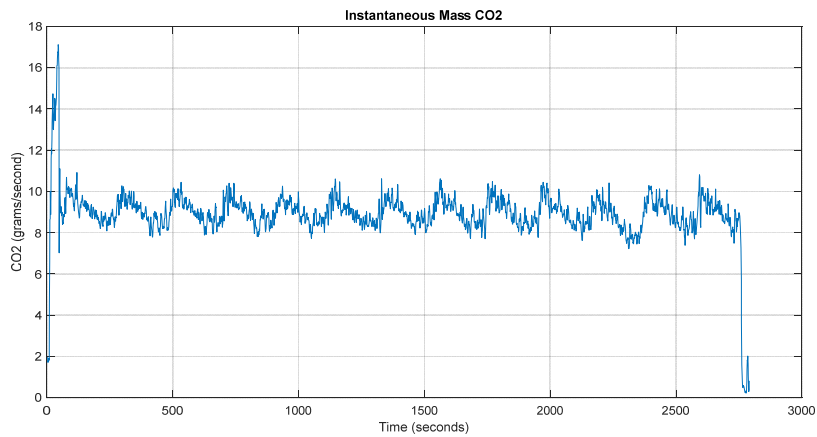


Figure 3.2.2: Vehicle 3 – 80 MPH Steady State Cruise Instantaneous Mass CO₂

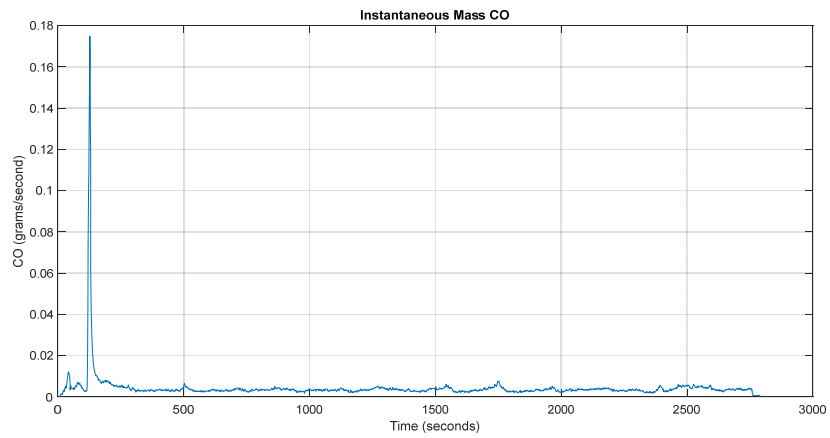


Figure 3.2.3: Vehicle 3 – 80 MPH Steady State Cruise Instantaneous Mass CO

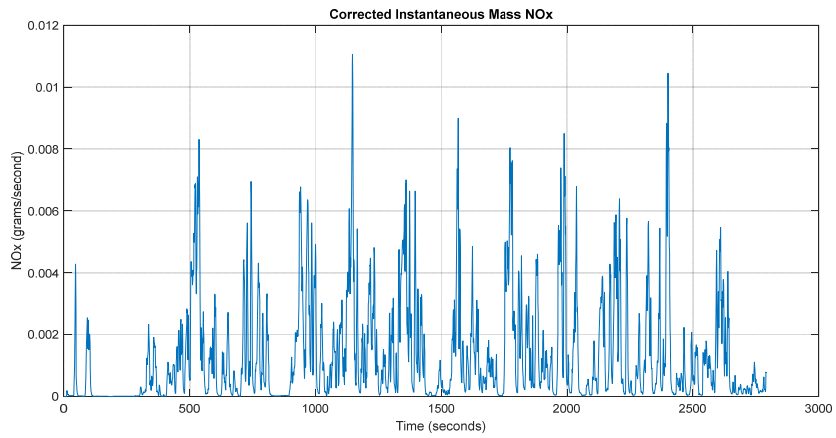


Figure 3.2.4: Vehicle 3 – 80 MPH Steady State Cruise Corrected Instantaneous Mass NOx

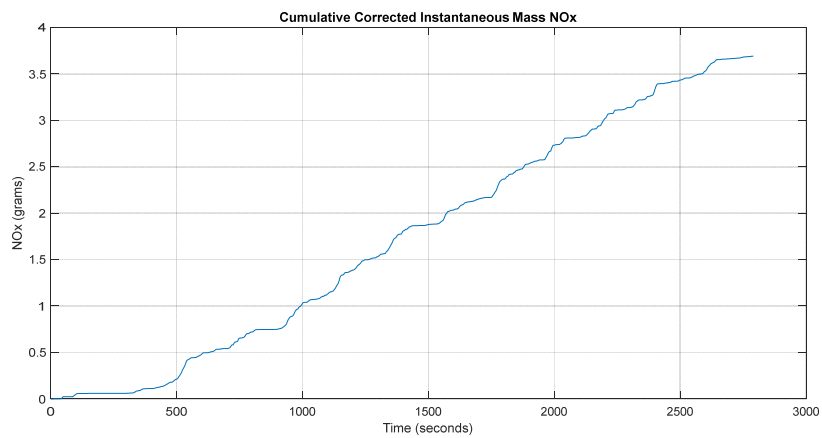


Figure 3.2.5: Vehicle 3 – 80 MPH Steady State Cruise Cumulative Corrected Instantaneous Mass NOx

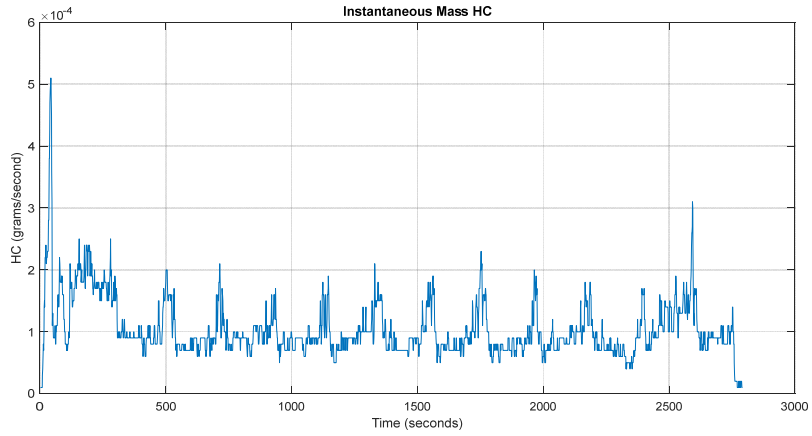


Figure 3.2.6: Vehicle 3 – 80 MPH Steady State Cruise Instantaneous Mass HC

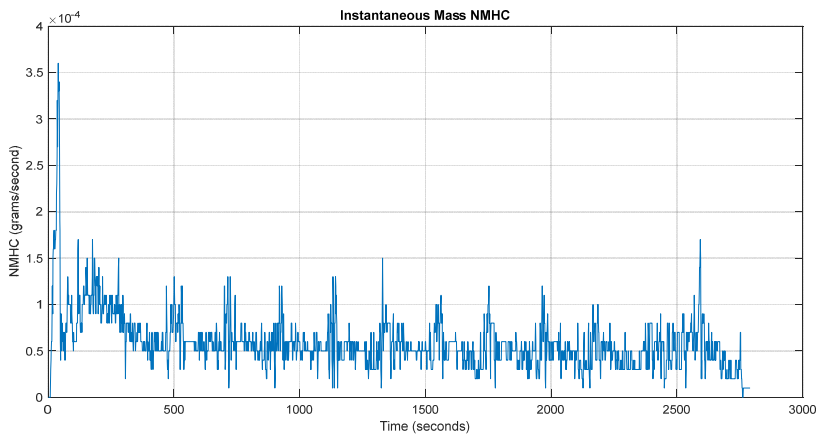


Figure 3.2.7: Vehicle 3 – 80 MPH Steady State Cruise Instantaneous Mass NMHC

iii. Transient Cycle PEMS Test

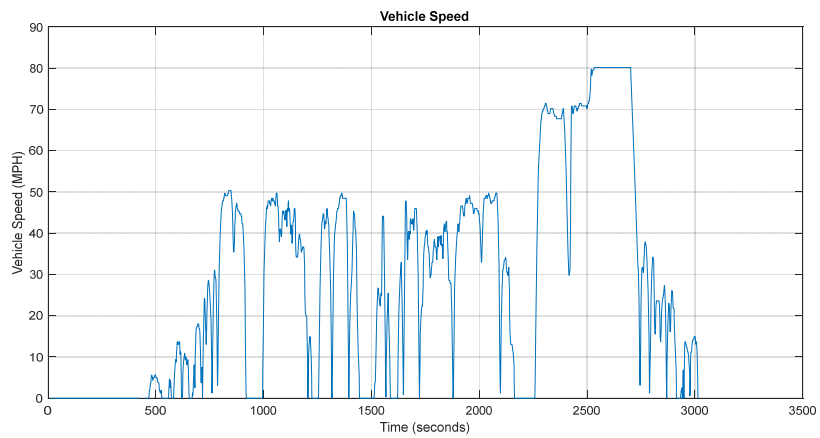


Figure 3.3.1: Vehicle 3 – Transient Cycle Vehicle Speed

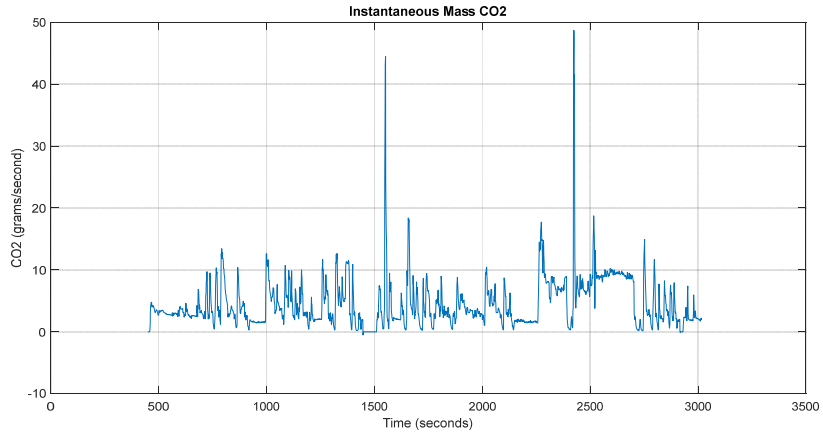


Figure 3.3.2: Vehicle 3 – Transient Cycle Instantaneous Mass CO2

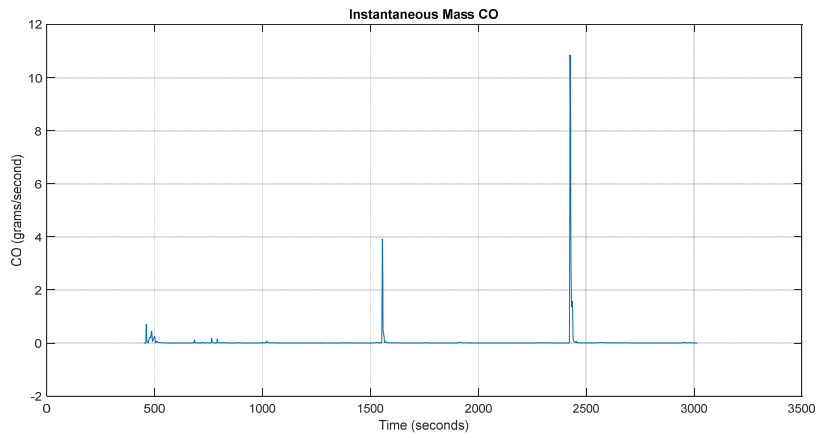


Figure 3.3.3: Vehicle 3 – Transient Cycle Instantaneous Mass CO

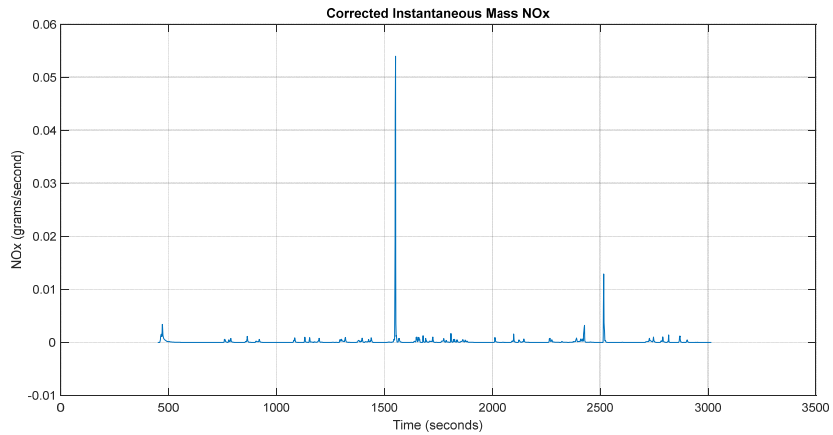


Figure 3.3.4: Vehicle 3 – Transient Cycle Corrected Instantaneous Mass NOx

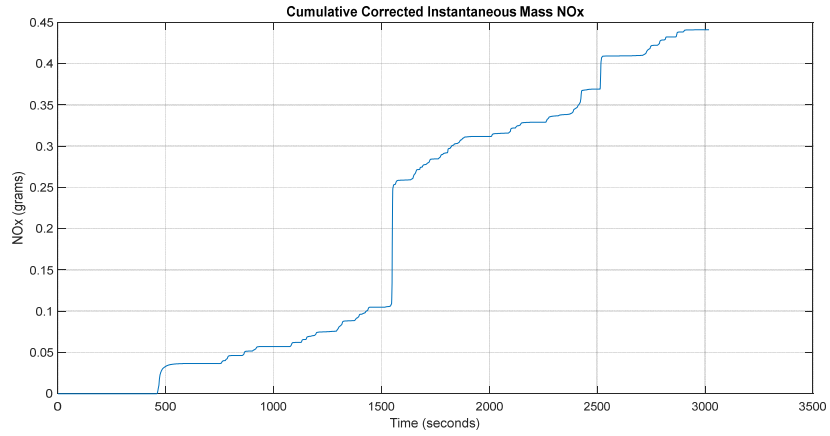


Figure 3.3.5: Vehicle 3 – Transient Cycle Cumulative Corrected Instantaneous Mass NO_x

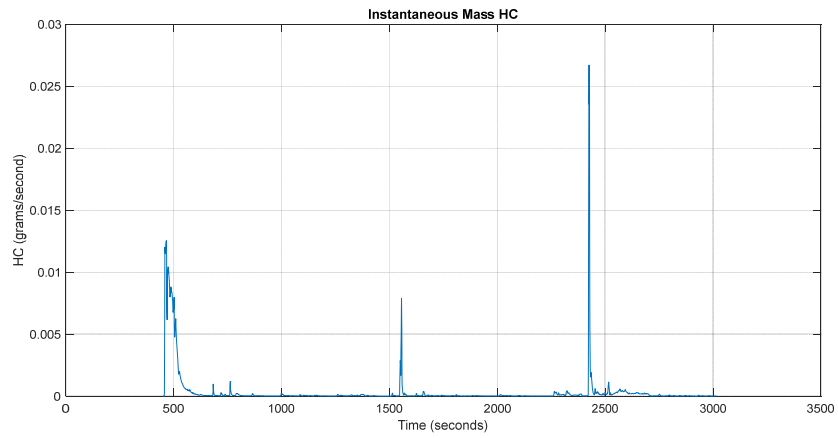


Figure 3.3.6: Vehicle 3 – Transient Cycle Instantaneous Mass HC

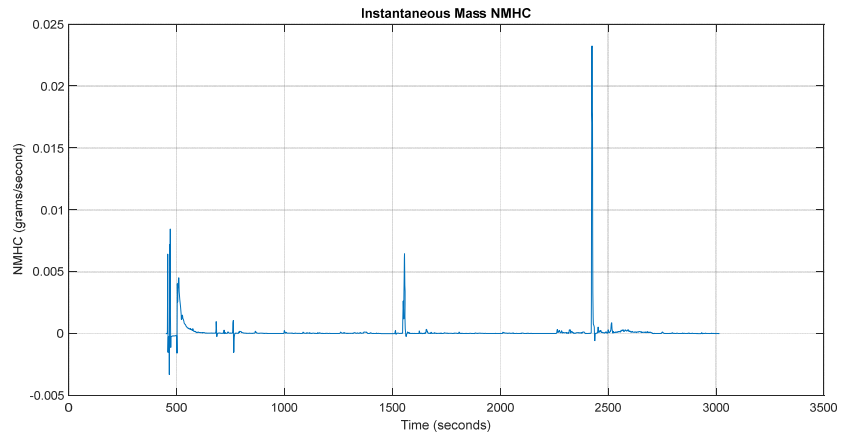


Figure 3.3.7: Vehicle 3 – Transient Cycle Instantaneous Mass NMHC

4. **Vehicle 4 – MCRXT02.45P1 – V1KLJ4662**
2.4L Jeep Cherokee Latitude Plus 4X4

a. **Summary Table(s)**

Steady State	NOx (g/mi)	CO2 (g/mi)	CO (g/mi)	NMHC (g/mi)	HC (g/mi)
30	0.0002	227.7168	0.0846	-0.0002	0.0002
50	0.0007	302.1987	0.0916	-0.0001	0.0016
60	0.0010	324.5622	0.1557	-0.0001	0.0019
65	0.0009	364.9152	0.2153	-0.0014	0.0029
70	0.0011	374.9667	0.3977	-0.0015	0.0030
65	0.0012	355.4266	0.2036	-0.0016	0.0028
75	0.0009	372.5804	0.5680	-0.0018	0.0032
80	0.0006	389.7959	0.4345	-0.0019	0.0031
85	0.0005	422.9773	0.7260	-0.0019	0.0035

Table 4.1: Vehicle 4 – Steady State
File: V1KLJ4662_SSPEMS010321050480.pems.csv

80 MPH Steady State Cruise	NOx (g/mi)	CO2 (g/mi)	CO (g/mi)	NMHC (g/mi)	HC (g/mi)
80	0.0002	408.0663	0.4412	0.0000	0.0019

Table 4.2: Vehicle 4 – 80 MPH Steady State Cruise
File: V1KLJ4662_80SS45010321050480.pems.csv

Transient Cycle	NOx (g/mi)	CO2 (g/mi)	CO (g/mi)	NMHC (g/mi)	HC (g/mi)
Various	0.0054	460.8431	2.4094	0.0051	0.0111

Table 4.3: Vehicle 4 – Transient Cycle
File: V1KLJ4662_P-IUVP010221050480.pems.csv

b. Summary Plot(s)

i. Steady State PEMS Test

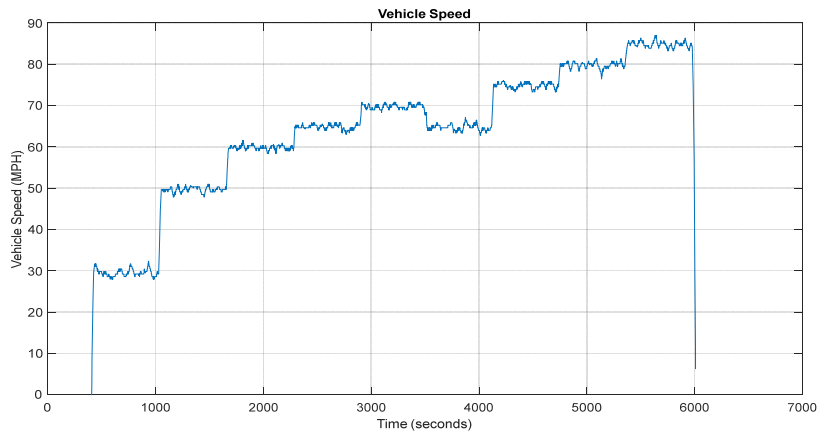


Figure 4.1.1: Vehicle 4 – Steady State Vehicle Speed

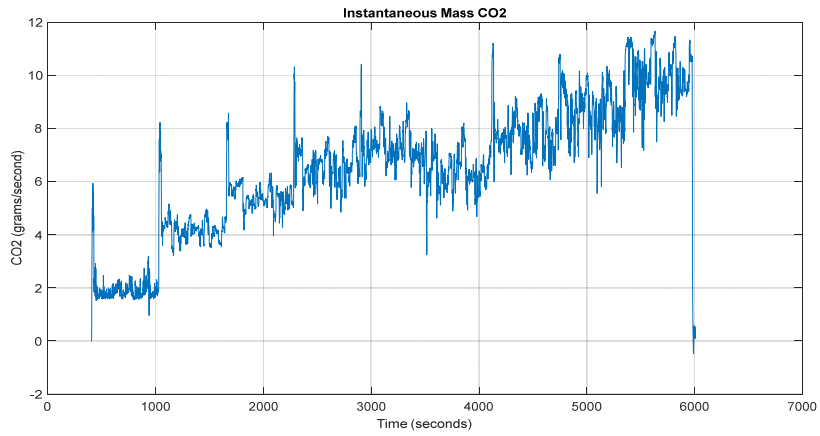


Figure 4.1.2: Vehicle 4 – Steady State Instantaneous Mass CO2

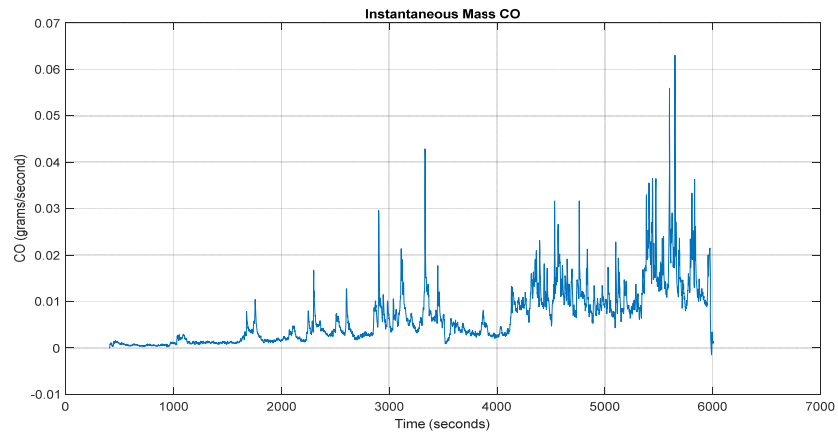


Figure 4.1.3: Vehicle 4 – Steady State Instantaneous Mass CO

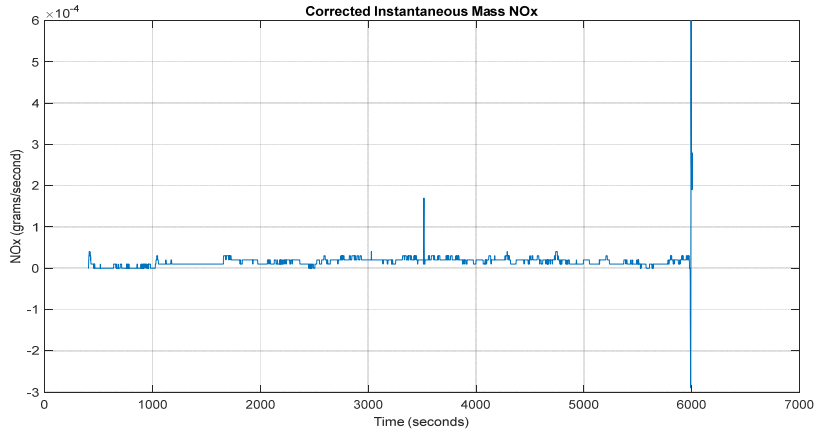


Figure 4.1.4: Vehicle 4 – Steady State Corrected Instantaneous Mass NOx

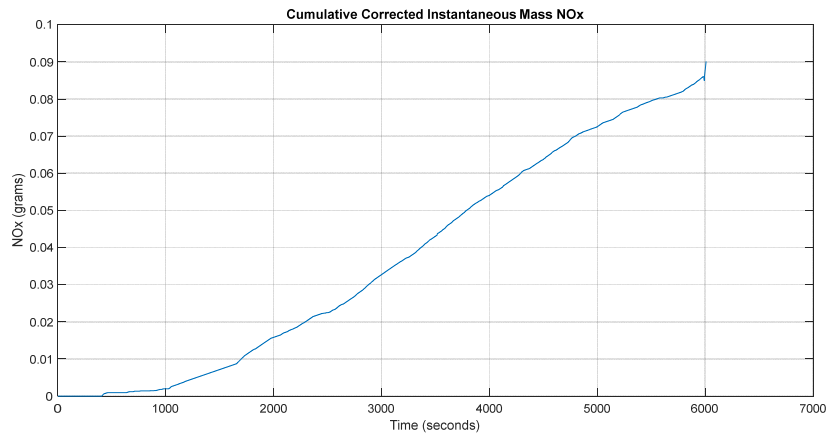


Figure 4.1.5: Vehicle 4 – Steady State Cumulative Corrected Instantaneous Mass NOx

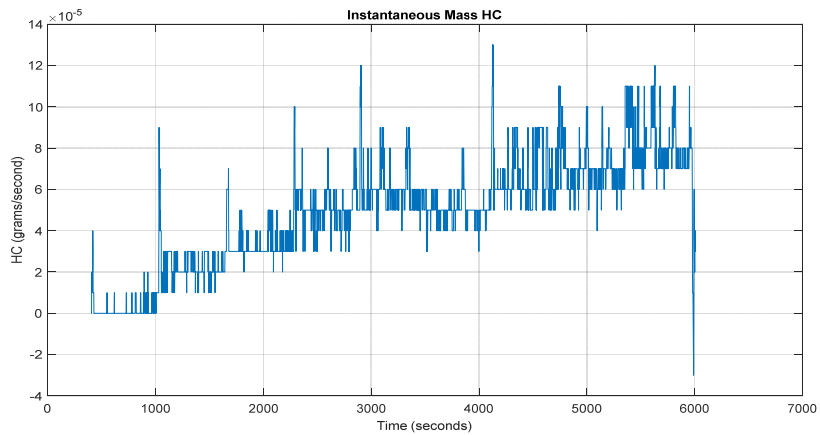


Figure 4.1.6: Vehicle 4 – Steady State Instantaneous Mass HC

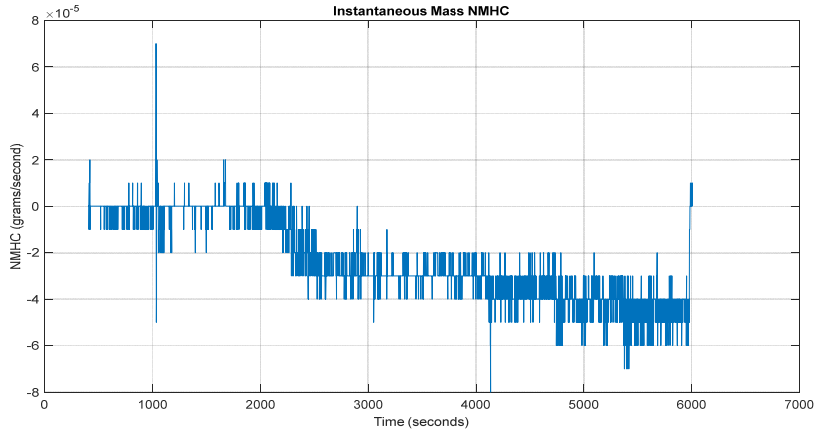


Figure 4.1.7: Vehicle 4 – Steady State Instantaneous Mass NMHC

ii. 80 MPH Steady State PEMS Test

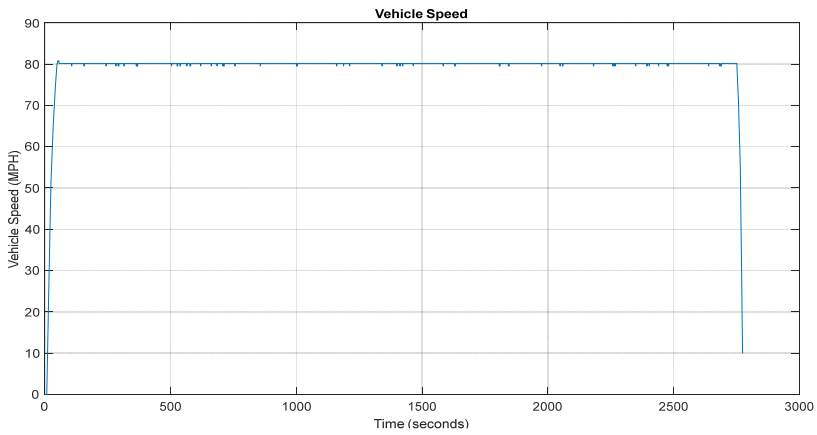


Figure 4.2.1: Vehicle 4 – 80 MPH Steady State Cruise Vehicle Speed

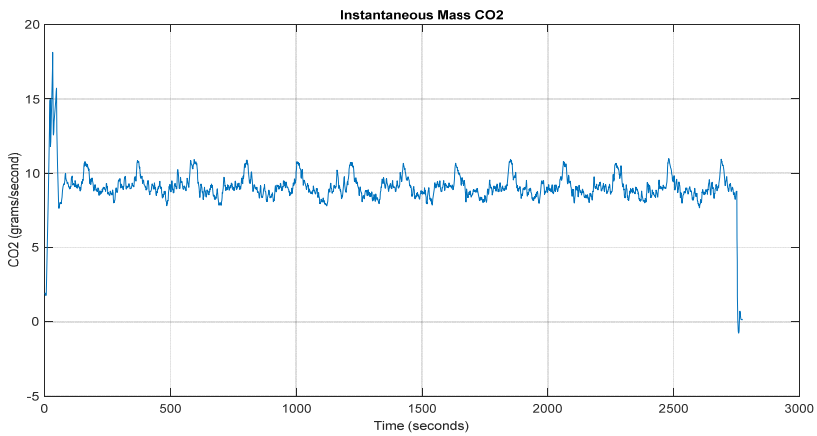


Figure 4.2.2: Vehicle 4 – 80 MPH Steady State Cruise Instantaneous Mass CO2

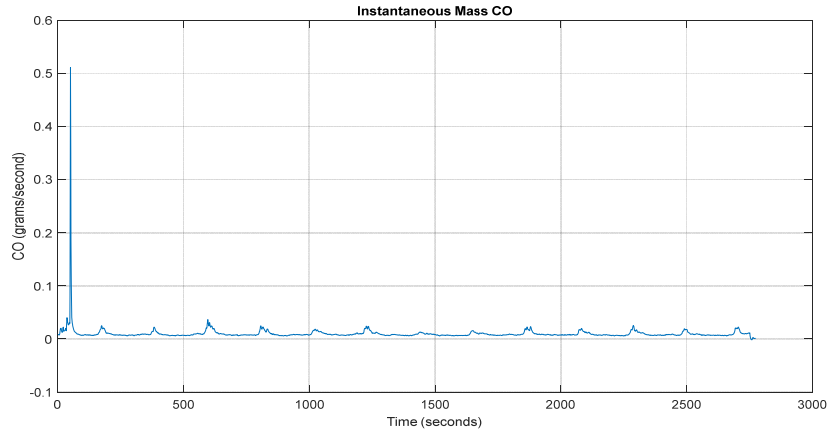


Figure 4.2.3: Vehicle 4 – 80 MPH Steady State Cruise Instantaneous Mass CO

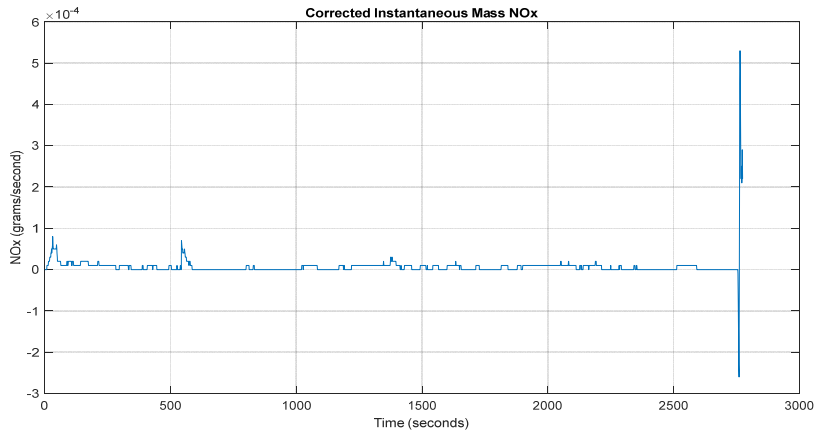


Figure 4.2.4: Vehicle 4 – 80 MPH Steady State Cruise Corrected Instantaneous Mass NOx

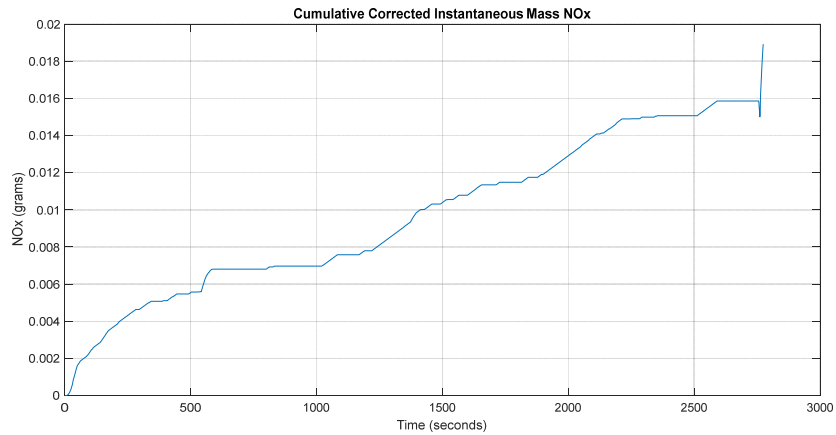


Figure 4.2.5: Vehicle 4 – 80 MPH Steady State Cruise Cumulative Corrected Instantaneous Mass NOx

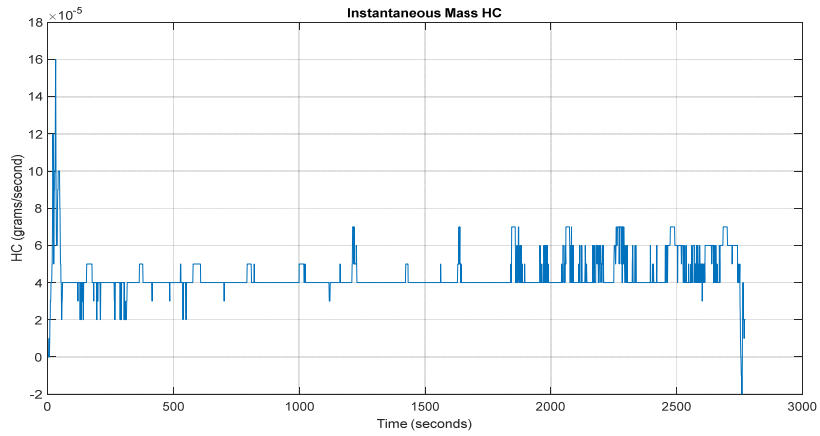


Figure 4.2.6: Vehicle 4 – 80 MPH Steady State Cruise Instantaneous Mass HC

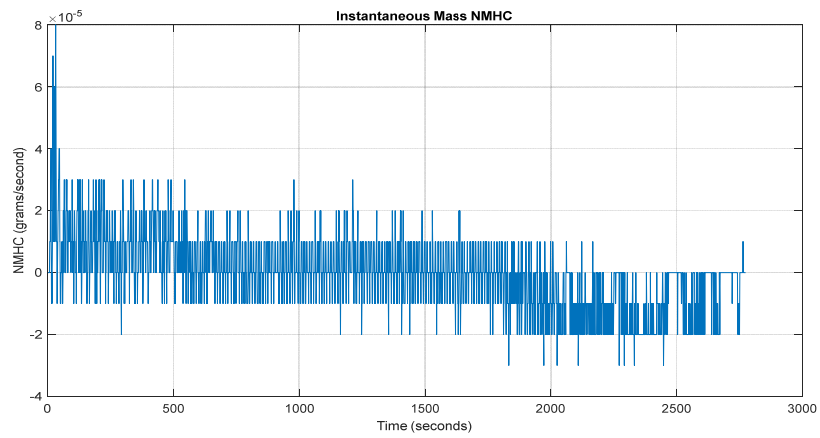


Figure 4.2.7: Vehicle 4 – 80 MPH Steady State Cruise Instantaneous Mass NMHC

iii. Transient Cycle PEMS Test

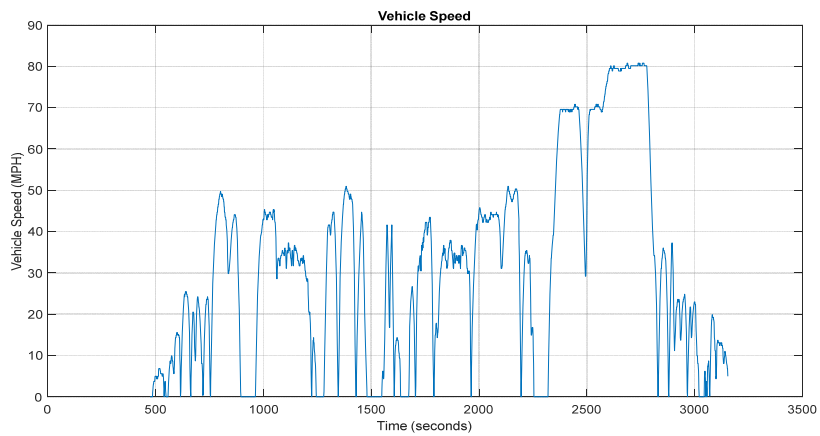


Figure 4.3.1: Vehicle 4 – Transient Cycle Vehicle Speed

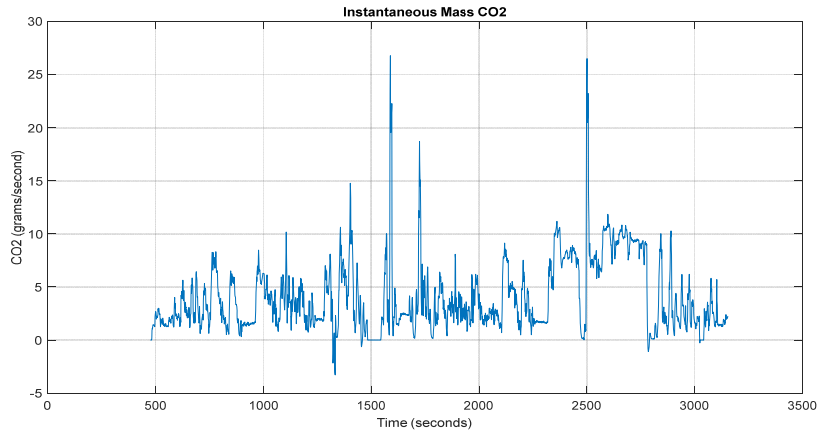


Figure 4.3.2: Vehicle 4 – Transient Cycle Instantaneous Mass CO2

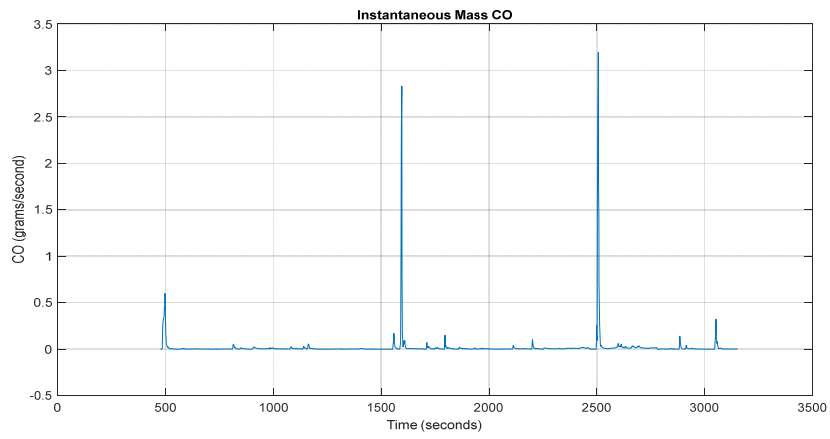


Figure 4.3.3: Vehicle 4 – Transient Cycle Instantaneous Mass CO

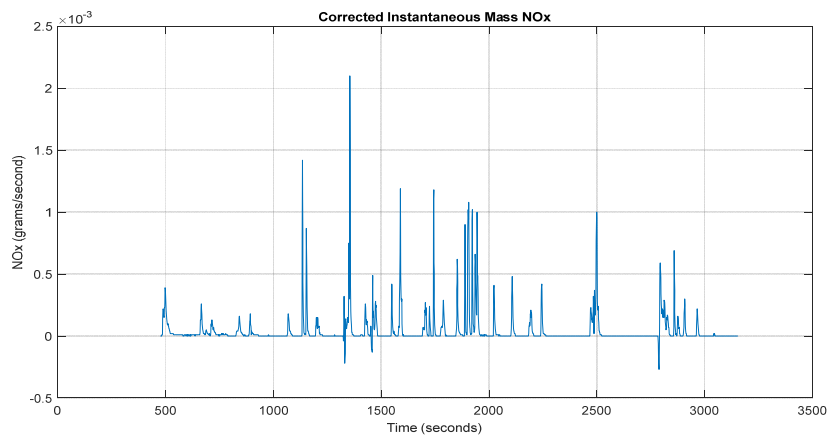


Figure 4.3.4: Vehicle 4 – Transient Cycle Corrected Instantaneous Mass NOx

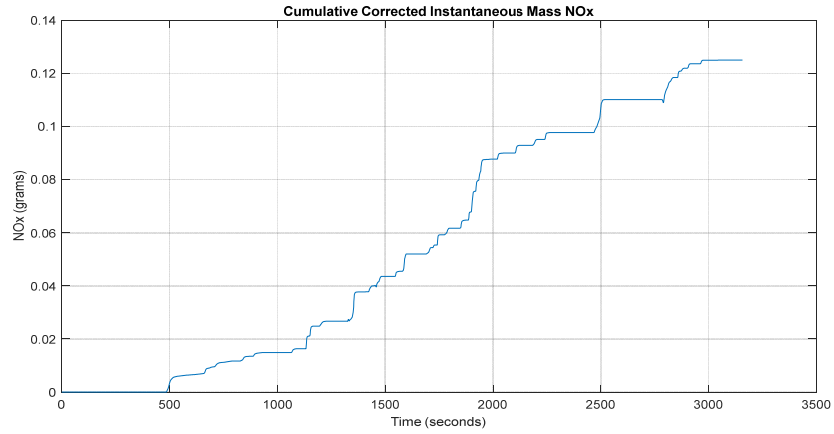


Figure 4.3.5: Vehicle 4 – Transient Cycle Cumulative Corrected Instantaneous Mass NOx

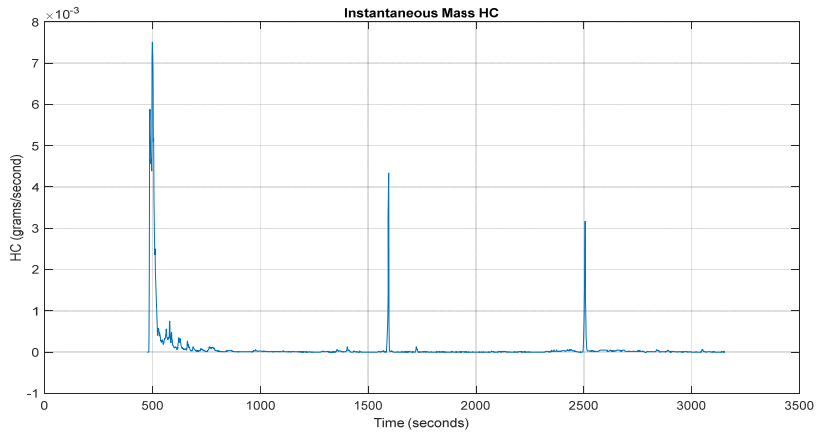


Figure 4.3.6: Vehicle 4 – Transient Cycle Instantaneous Mass HC

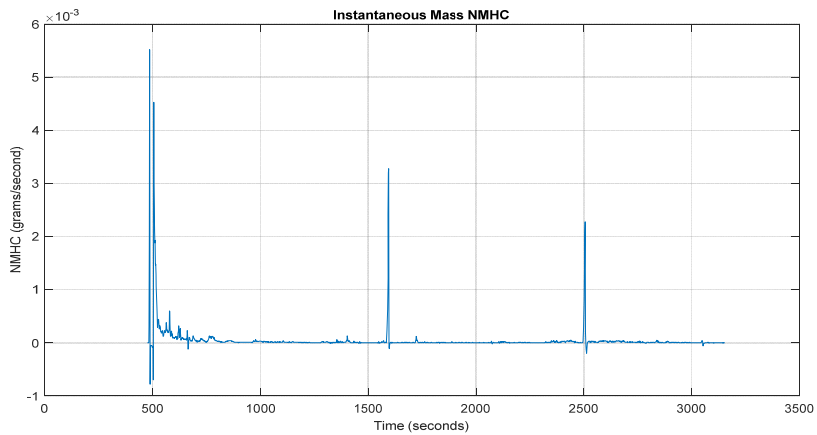


Figure 4.3.7: Vehicle 4 – Transient Cycle Instantaneous Mass NMHC

**5. Vehicle 5 (Retest) – MCRXT05.75P0 – V1DT60145
5.7L Non-BSG RAM 1500 Rebel Quad Cab 4X4**

a. Summary Table(s)

Steady State	NOx (g/mi)	CO2 (g/mi)	CO (g/mi)	NMHC (g/mi)	HC (g/mi)
30	0.0016	334.6224	0.4500	0.0011	0.0012
50	0.0022	392.6680	0.3421	0.0019	0.0033
60	0.0336	461.0574	0.3777	0.0362	0.0058
65	0.0044	508.1262	0.2985	0.0037	0.0084
70	0.0041	546.0516	0.7339	0.0070	0.0190
65	0.0107	512.5264	0.4300	0.0028	0.0071
75	0.0057	587.0850	0.9285	0.0054	0.0158
80	0.0079	637.1320	0.9140	0.0031	0.0100
85	0.0763	694.8347	0.9614	0.0019	0.0069

**Table 5.1: Vehicle 5 (Retest) – Steady State
File: V1DT60145_SSPEMS010121092780.pems.csv**

80 MPH Steady State Cruise	NOx (g/mi)	CO2 (g/mi)	CO (g/mi)	NMHC (g/mi)	HC (g/mi)
80	0.0042	657.0440	0.9806	-0.0059	0.0000

**Table 5.2: Vehicle 5 – 80 MPH Steady State Cruise
File: V1DT60145_80SS45010221051780.pems.csv**

Transient Cycle	NOx (g/mi)	CO2 (g/mi)	CO (g/mi)	NMHC (g/mi)	HC (g/mi)
Various	0.0147	646.8259	5.8068	0.0051	0.0212

**Table 5.3: Vehicle 5 – Transient Cycle
File: V1DT60145_P-IUVP010121051780.pems.csv**

b. Summary Plot(s)
i. Steady State PEMS Test

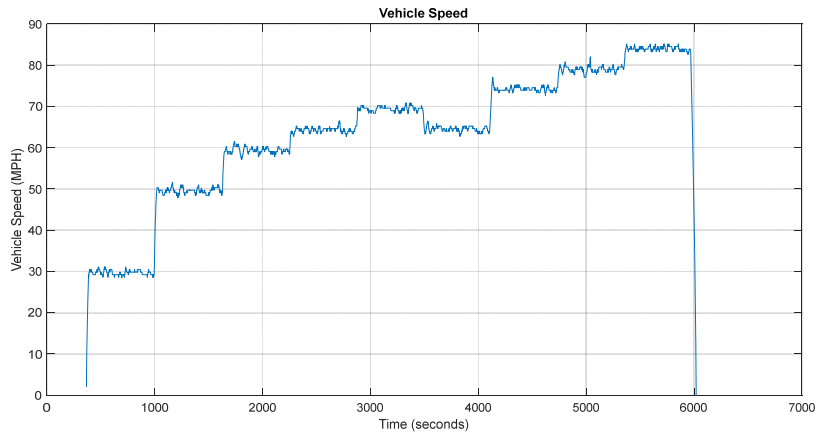


Figure 5.1.1: Vehicle 5 (Retest) – Steady State Vehicle Speed

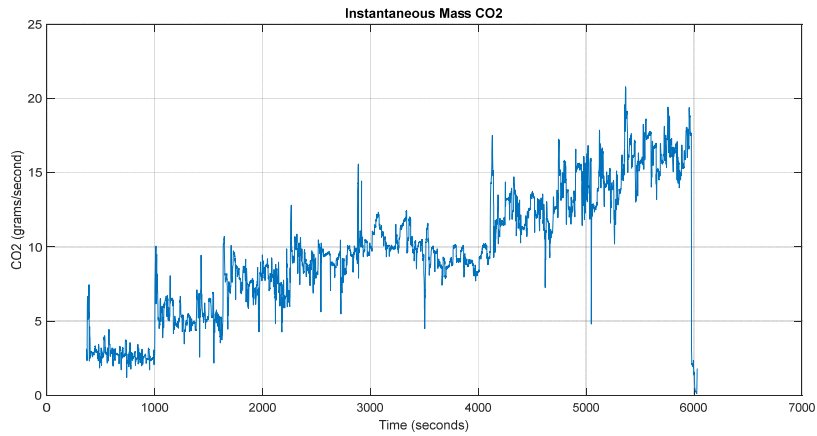


Figure 5.1.2: Vehicle 5 (Retest) – Steady State Instantaneous Mass CO2

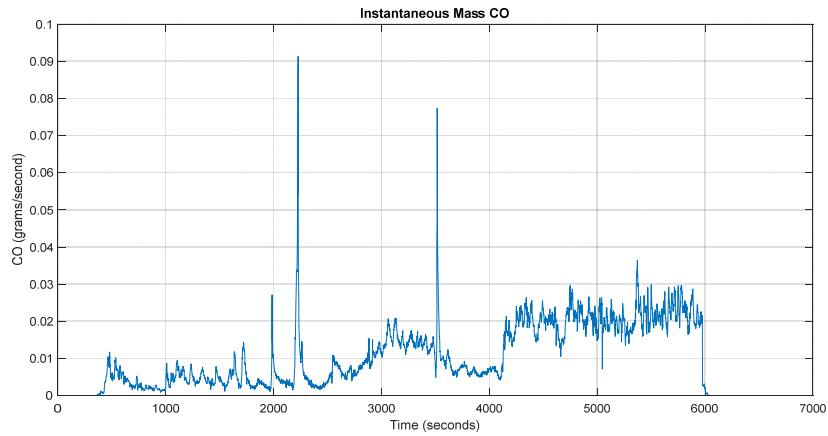


Figure 5.1.3: Vehicle 5 (Retest) – Steady State Instantaneous Mass CO

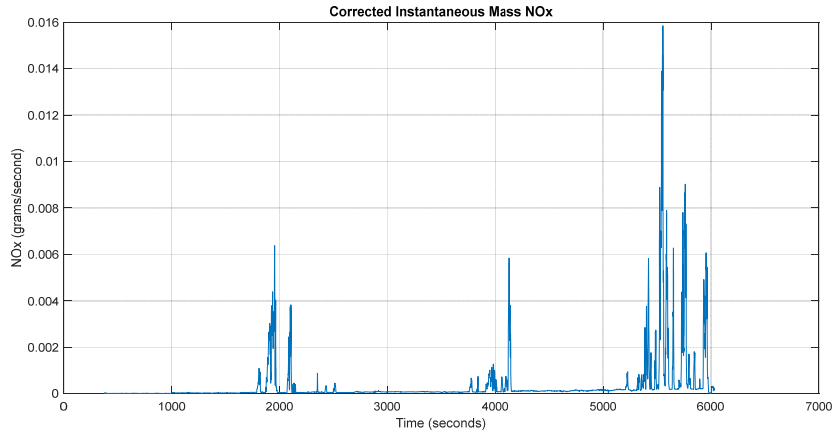


Figure 5.1.4: Vehicle 5 (Retest) – Steady State Corrected Instantaneous Mass NOx

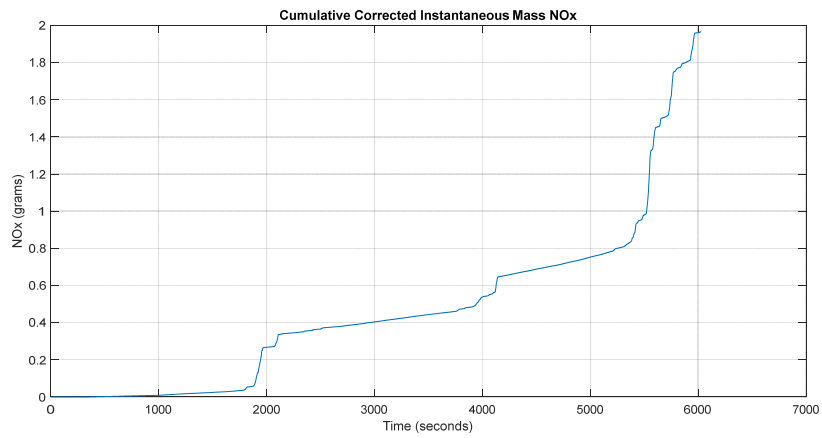


Figure 5.1.5: Vehicle 5 (Retest) – Steady State Cumulative Corrected Instantaneous Mass NOx

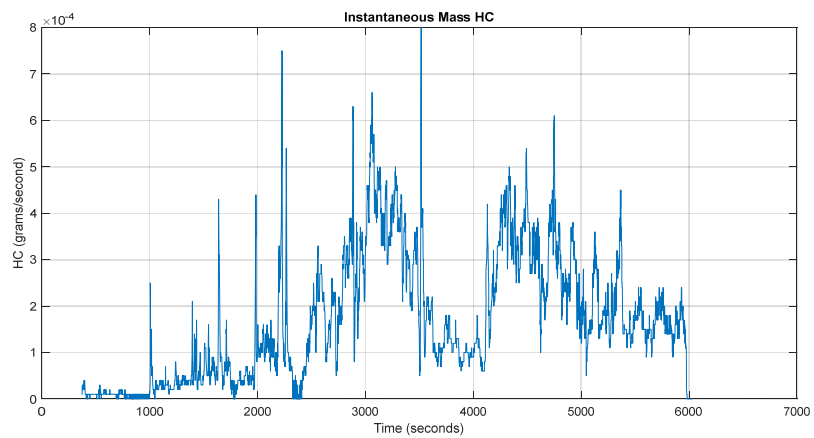


Figure 5.1.6: Vehicle 5 (Retest) – Steady State Instantaneous Mass HC

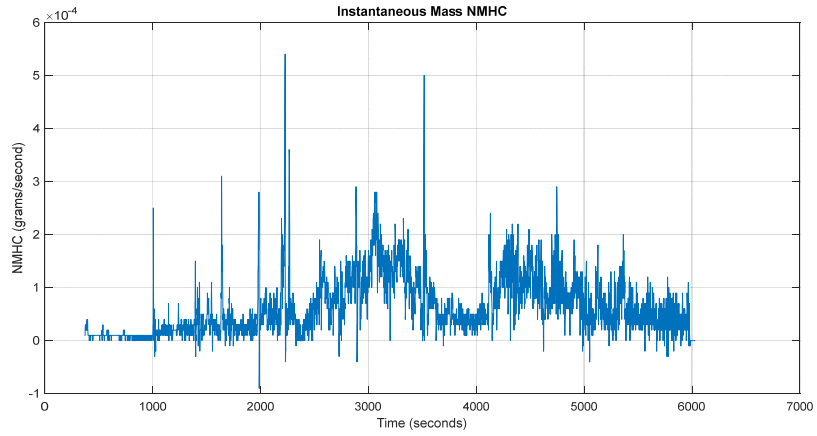


Figure 5.1.7: Vehicle 5 (Retest) – Steady State Instantaneous Mass NMHC

ii. 80 MPH Steady State Cruise PEMS Test

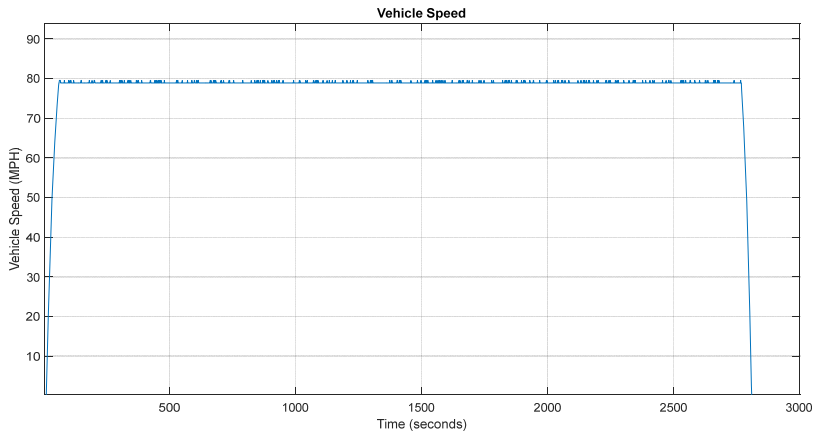


Figure 5.2.1: Vehicle 5 – 80 MPH Steady State Cruise Vehicle Speed

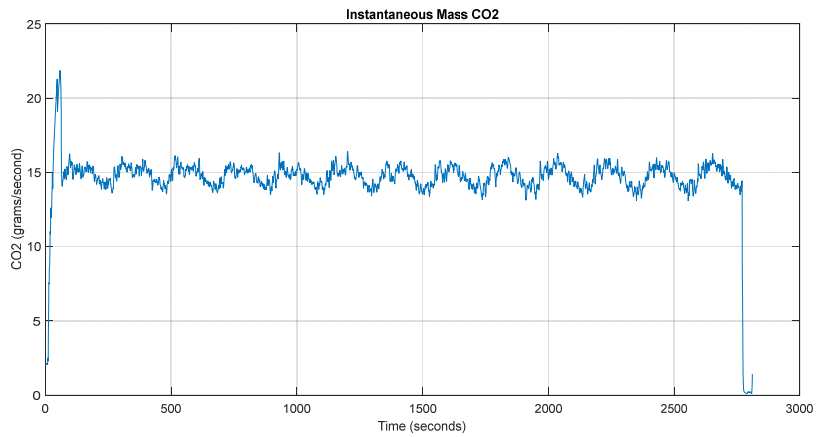


Figure 5.2.2: Vehicle 5 – 80 MPH Steady State Cruise Instantaneous Mass CO2

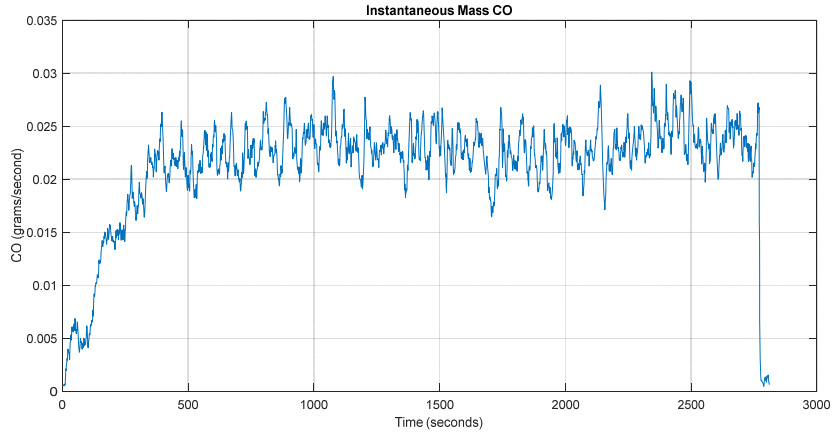


Figure 5.2.3: Vehicle 5 – 80 MPH Steady State Cruise Instantaneous Mass CO

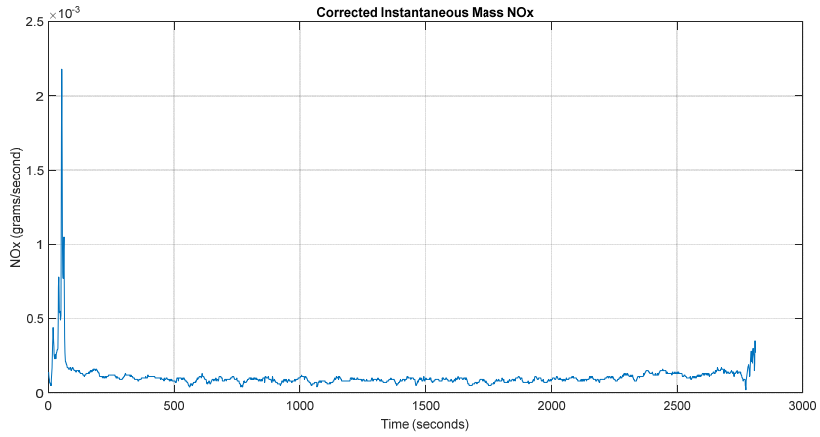


Figure 5.2.4: Vehicle 5 – 80 MPH Steady State Cruise Corrected Instantaneous Mass NOx

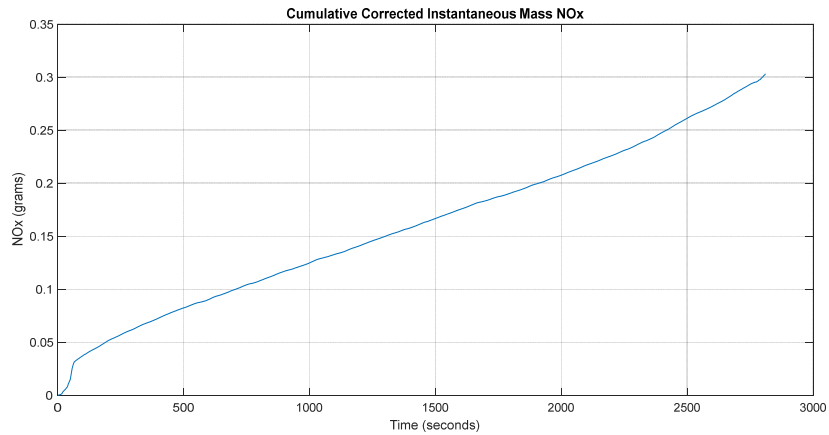


Figure 5.2.5: Vehicle 5 – 80 MPH Steady State Cruise Cumulative Corrected Instantaneous Mass NOx

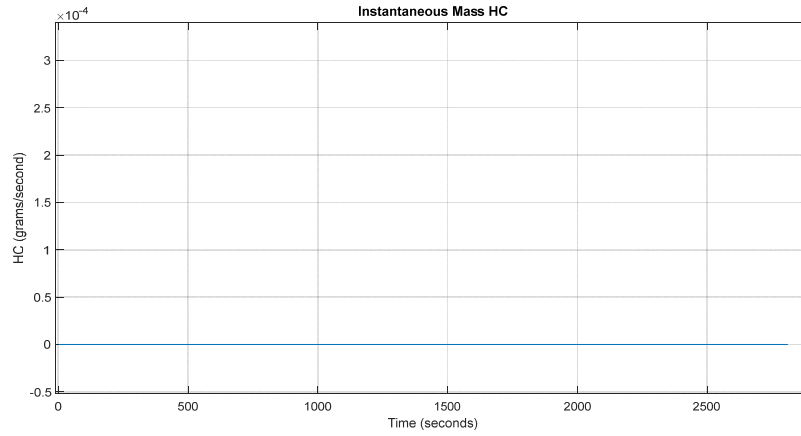


Figure 5.2.6: Vehicle 5 – 80 MPH Steady State Cruise Instantaneous Mass HC

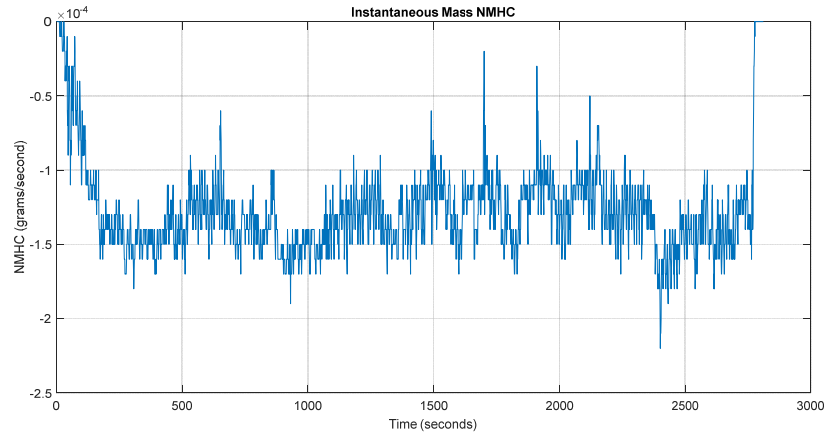


Figure 5.2.7: Vehicle 5 – 80 MPH Steady State Cruise Instantaneous Mass NMHC

iii. Transient Cycle PEMS Test

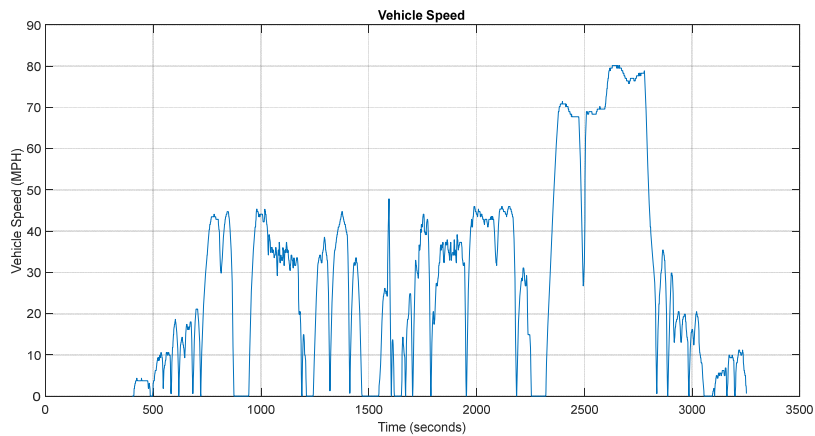


Figure 5.3.1: Vehicle 5 – Transient Cycle Vehicle Speed

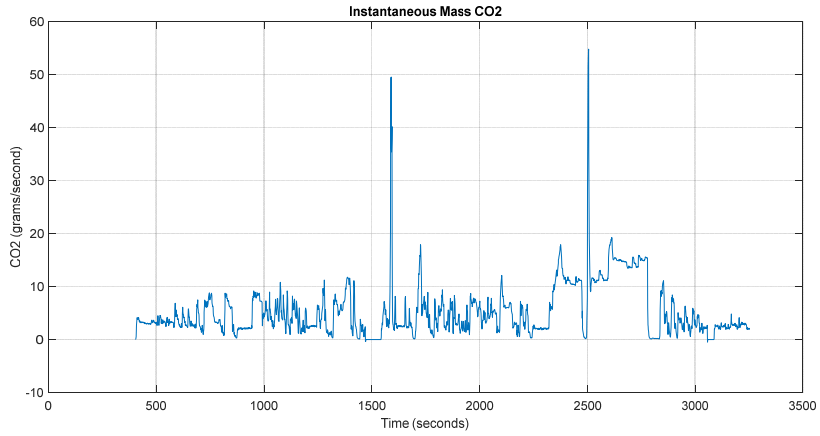


Figure 5.3.2: Vehicle 5 – Transient Cycle Instantaneous Mass CO2

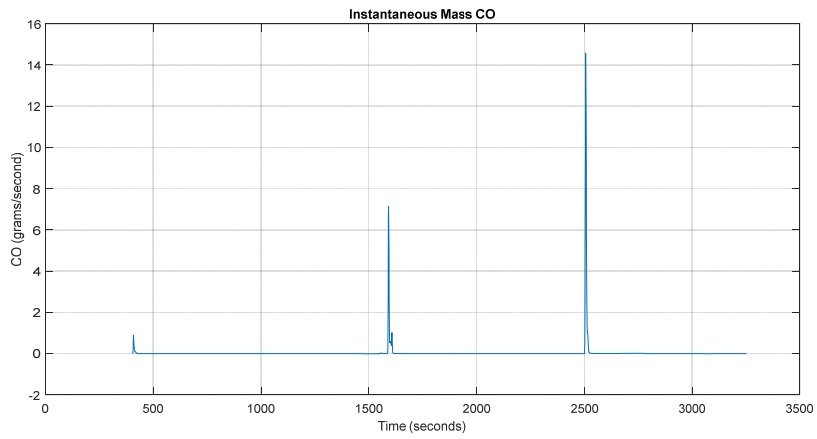


Figure 5.3.3: Vehicle 5 – Transient Cycle Instantaneous Mass CO

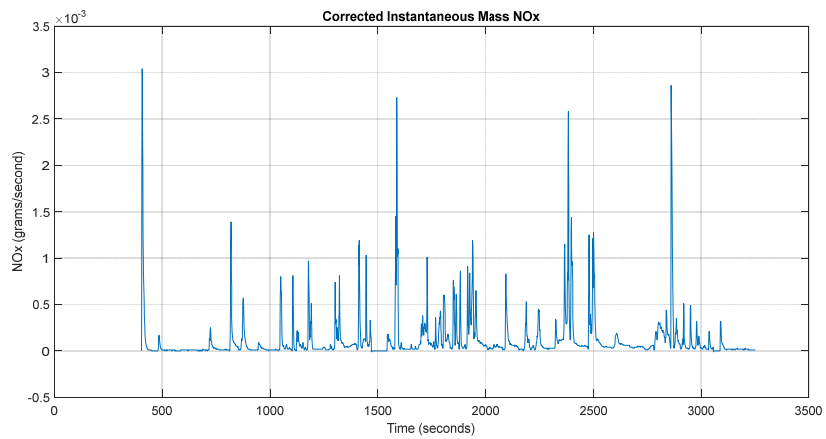


Figure 5.3.4: Vehicle 5 – Transient Cycle Corrected Instantaneous Mass NOx

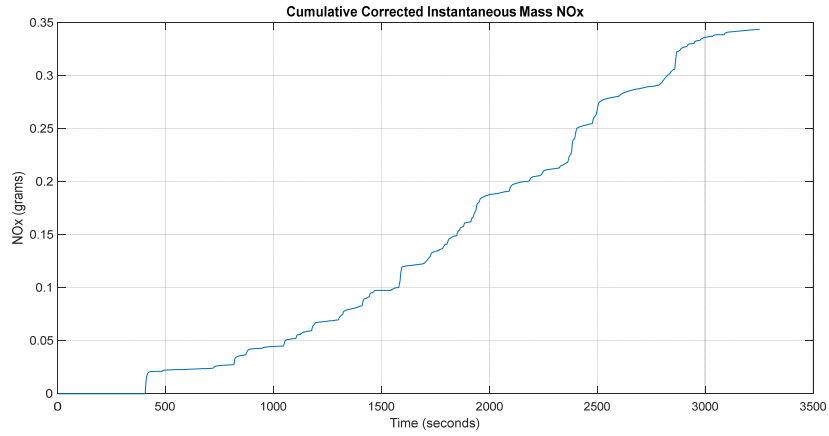


Figure 5.3.5: Vehicle 5 – Transient Cycle Cumulative Corrected Instantaneous Mass NO_x

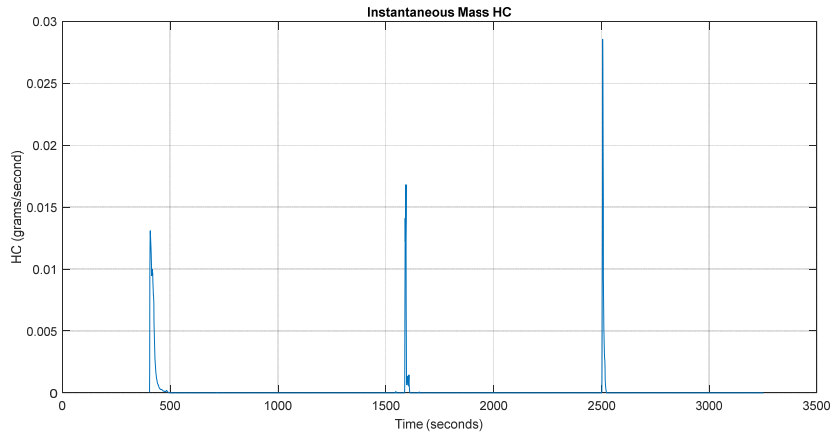


Figure 5.3.6: Vehicle 5 – Transient Cycle Instantaneous Mass HC

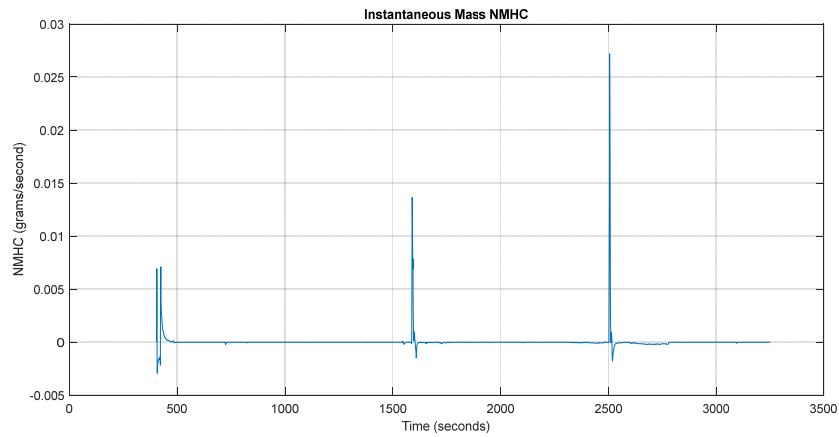


Figure 5.3.7: Vehicle 5 – Transient Cycle Instantaneous Mass NMHC

**6. Vehicle 6 – MCRXV05.75P4 – V1LAD4775
5.7L MTX Dodge Challenger R/T**

a. Summary Table(s)

Steady State	NOx (g/mi)	CO2 (g/mi)	CO (g/mi)	NMHC (g/mi)	HC (g/mi)
30	0.0141	381.0912	0.2160	-0.0007	0.0018
50	0.0002	306.5793	0.1349	-0.0004	0.0000
60	0.0009	340.6536	0.1486	-0.0006	0.0004
65	0.0201	334.6516	0.1224	0.0010	0.0038
70	0.0288	352.3427	0.1048	0.0020	0.0060
65	0.0154	327.5743	0.1554	0.0028	0.0081
75	0.0180	393.6828	0.2437	0.0038	0.0138
80	0.1569	415.4962	0.2163	0.0002	0.0058
85	0.1987	460.4212	0.2350	-0.0014	0.0033

**Table 6.1: Vehicle 6 – Steady State
File: V1LAD4775_SSPEMS010121060480.pems.csv**

80 MPH Steady State Cruise	NOx (g/mi)	CO2 (g/mi)	CO (g/mi)	NMHC (g/mi)	HC (g/mi)
80	0.1507	415.0973	0.1913	0.0008	0.0039

**Table 6.2: Vehicle 6 – 80 MPH Steady State Cruise
File: V1LAD4775_80SS45010321060380.pems.csv**

Transient Cycle	NOx (g/mi)	CO2 (g/mi)	CO (g/mi)	NMHC (g/mi)	HC (g/mi)
Various	0.0291	513.2196	1.3812	0.0139	0.0286

**Table 6.3: Vehicle 6 – Transient Cycle
File: V1LAD4775_P-IUVP010221060380.pems.csv**

b. Summary Plot(s)

i. Steady State PEMS Test

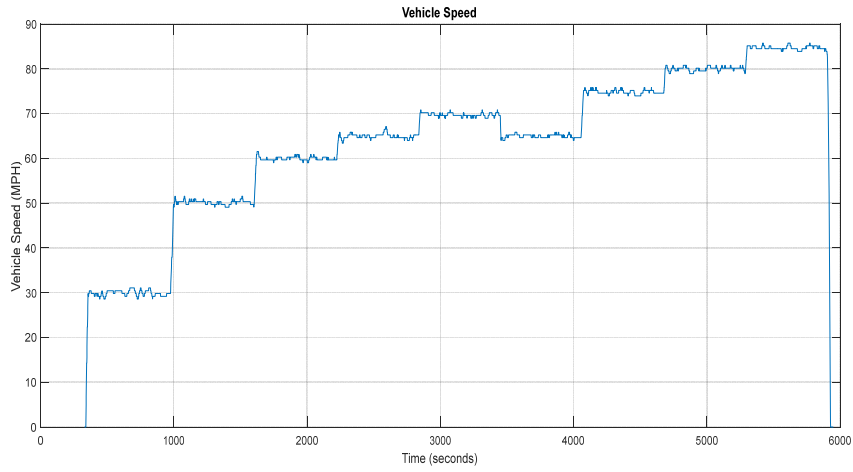


Figure 6.1.1: Vehicle 6 – Steady State Vehicle Speed

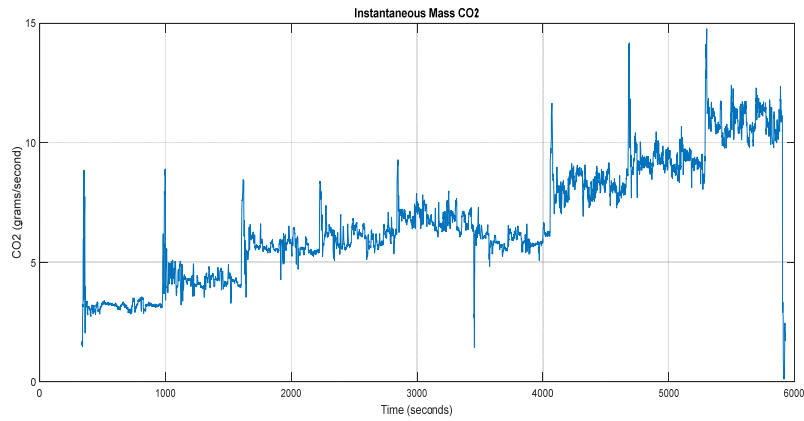


Figure 6.1.2: Vehicle 6 – Steady State Instantaneous Mass CO2

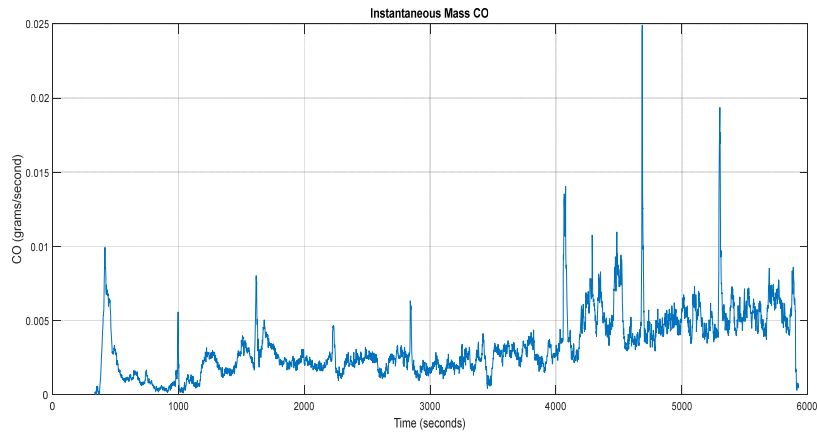


Figure 6.1.3: Vehicle 6 – Steady State Instantaneous Mass CO

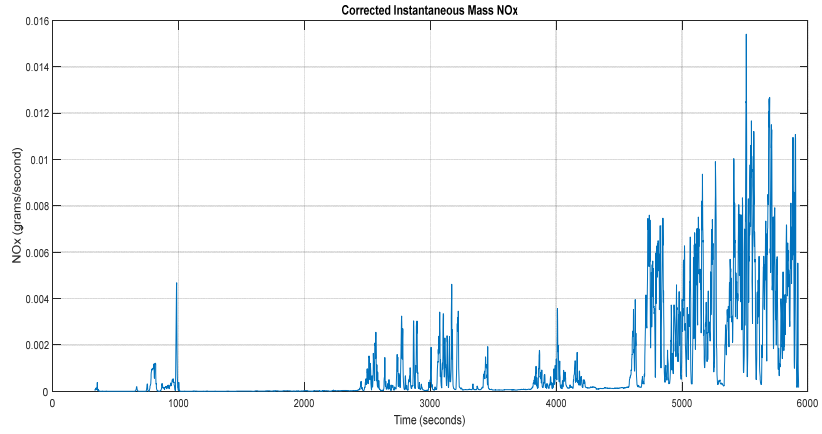


Figure 6.1.4: Vehicle 6 – Steady State Corrected Instantaneous Mass NOx

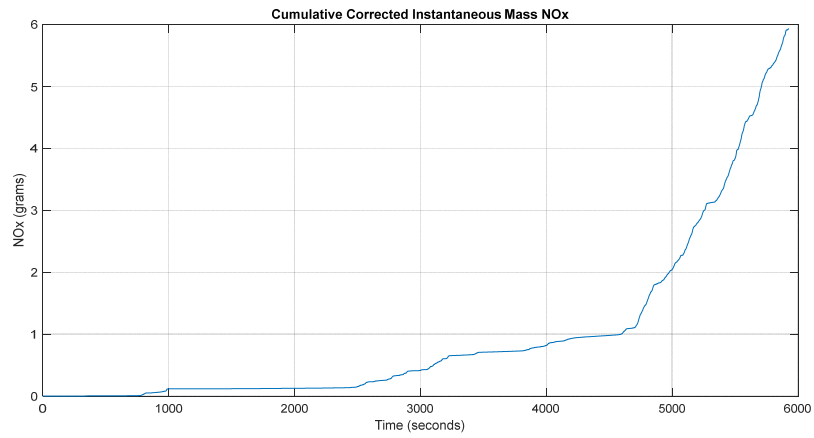


Figure 6.1.5: Vehicle 6 – Steady State Cumulative Corrected Instantaneous Mass NOx

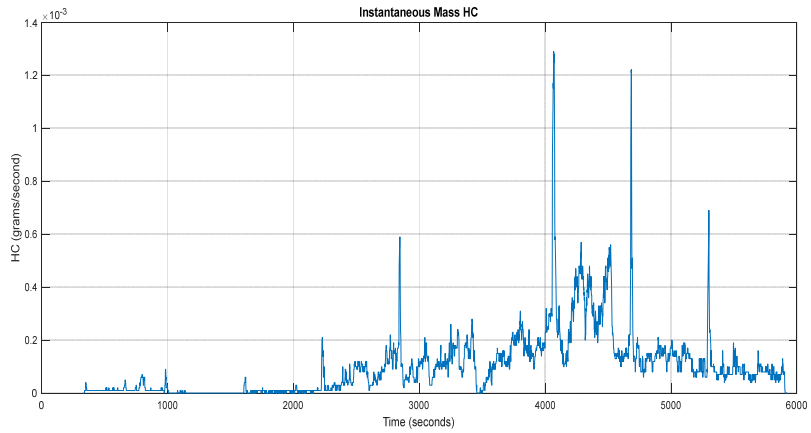


Figure 6.1.6: Vehicle 6 – Steady State Instantaneous Mass HC

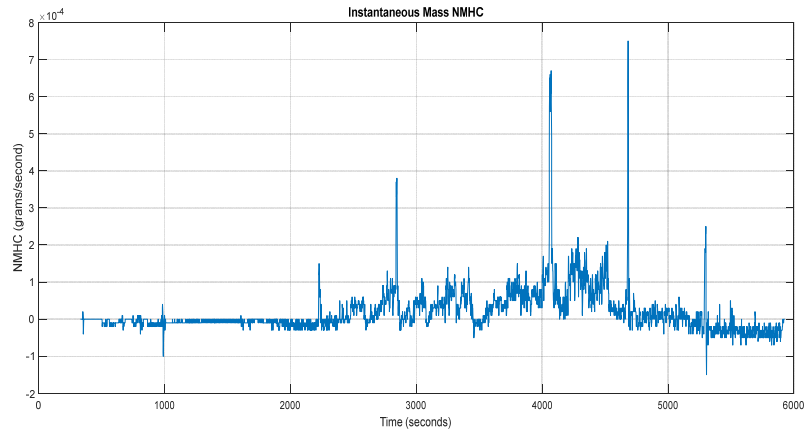


Figure 6.1.7: Vehicle 6 – Steady State Instantaneous Mass NMHC

ii. 80 MPH Steady State Cruise PEMS Test

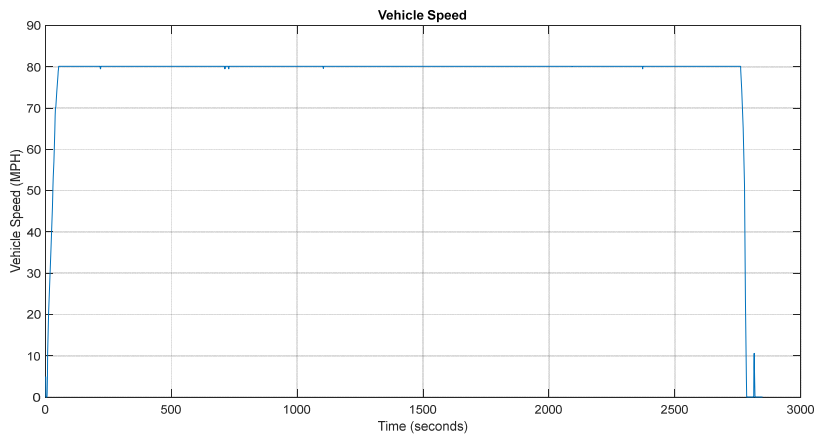


Figure 6.2.1: Vehicle 6 – 80 MPH Steady State Cruise Vehicle Speed

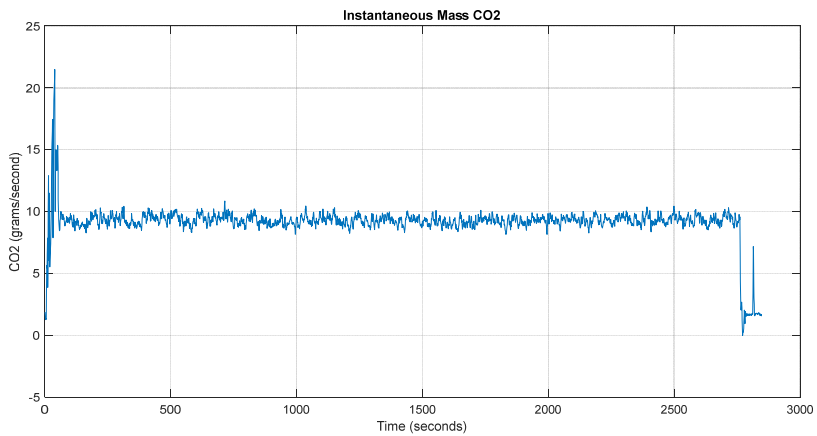


Figure 6.2.2: Vehicle 6 – 80 MPH Steady State Cruise Instantaneous Mass CO2

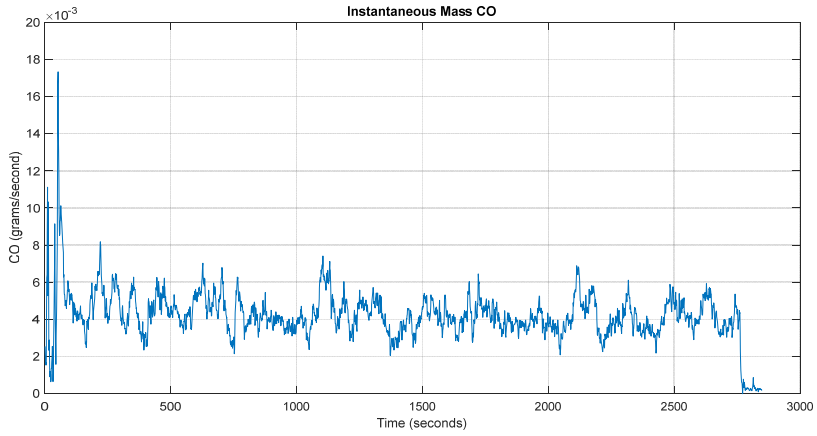


Figure 6.2.3: Vehicle 6 – 80 MPH Steady State Cruise Instantaneous Mass CO

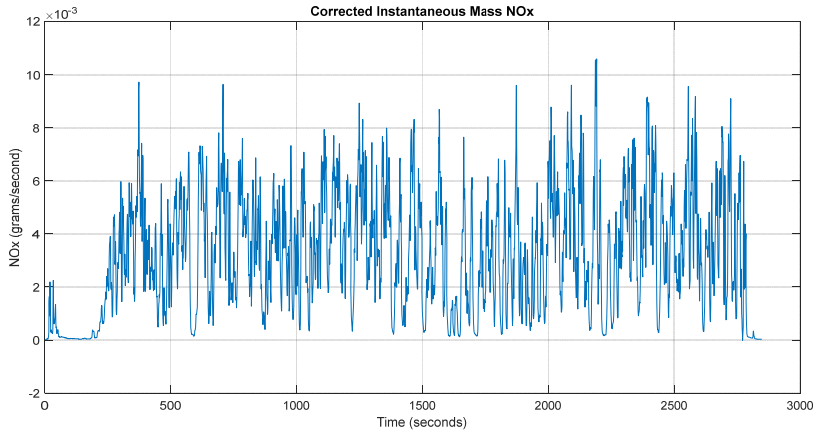


Figure 6.2.4: Vehicle 6 – 80 MPH Steady State Cruise Corrected Instantaneous Mass NOx

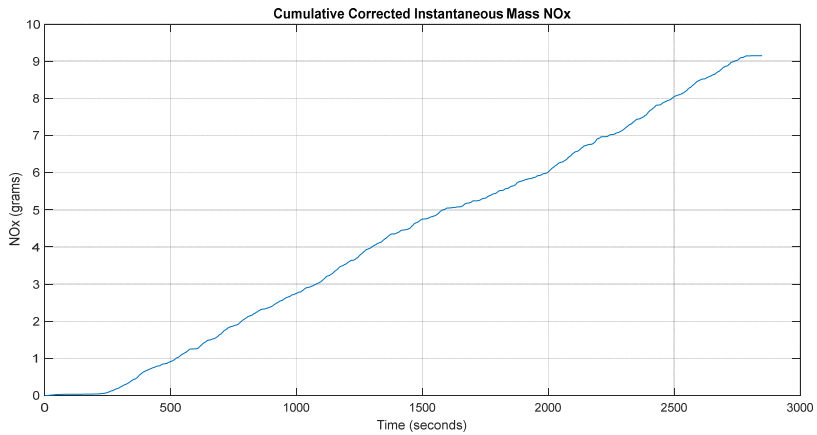


Figure 6.2.5: Vehicle 6 – 80 MPH Steady State Cruise Cumulative Corrected Instantaneous Mass NOx

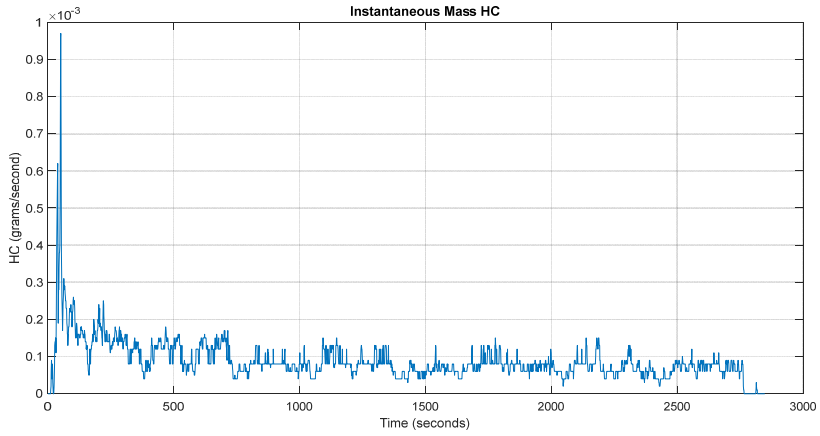


Figure 6.2.6: Vehicle 6 – 80 MPH Steady State Cruise Instantaneous Mass HC

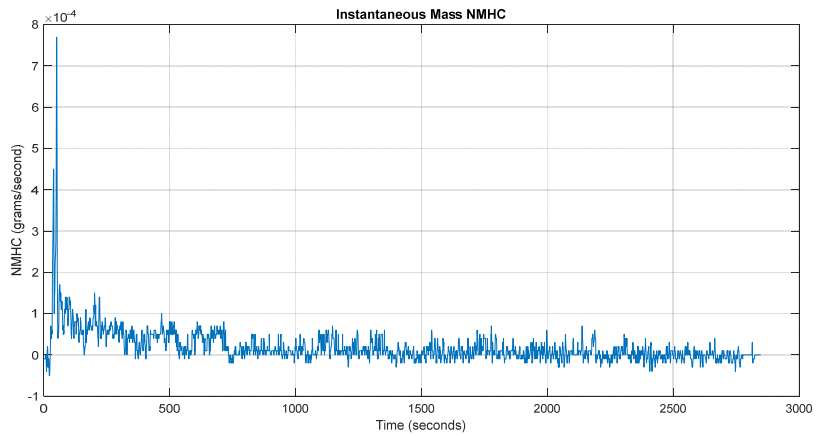


Figure 6.2.7: Vehicle 6 – Steady State Cruise Instantaneous Mass NMHC

iii. Transient Cycle PEMS Test

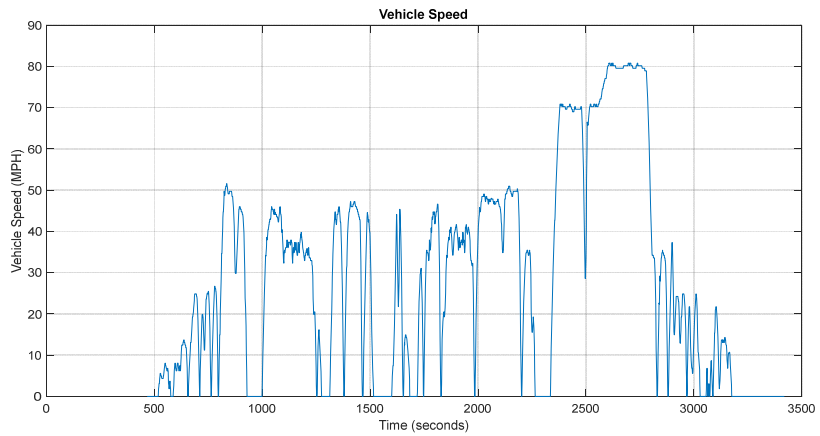


Figure 6.3.1: Vehicle 6 – Transient Cycle Vehicle Speed

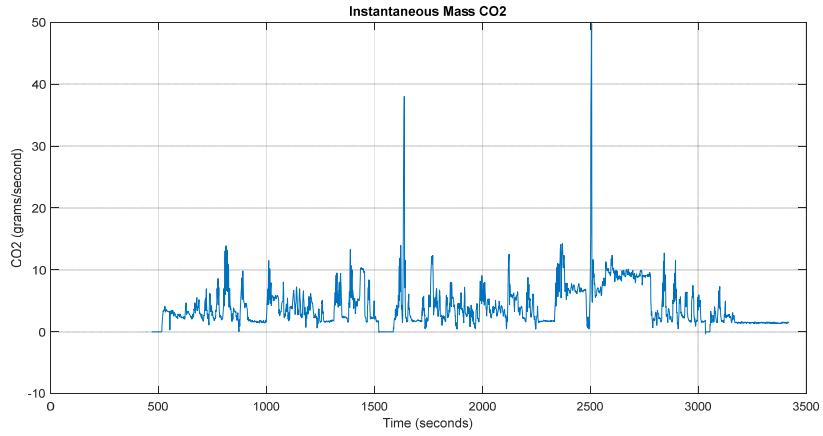


Figure 6.3.2: Vehicle 6 – Transient Cycle Instantaneous Mass CO2

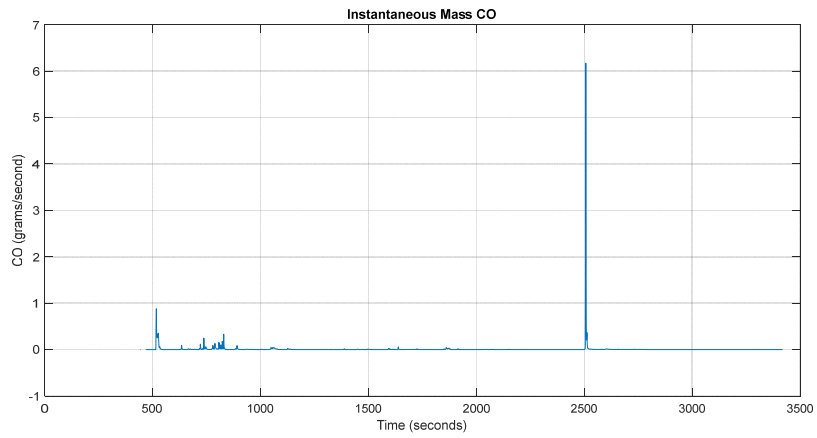


Figure 6.3.3: Vehicle 6 – Transient Cycle Instantaneous Mass CO

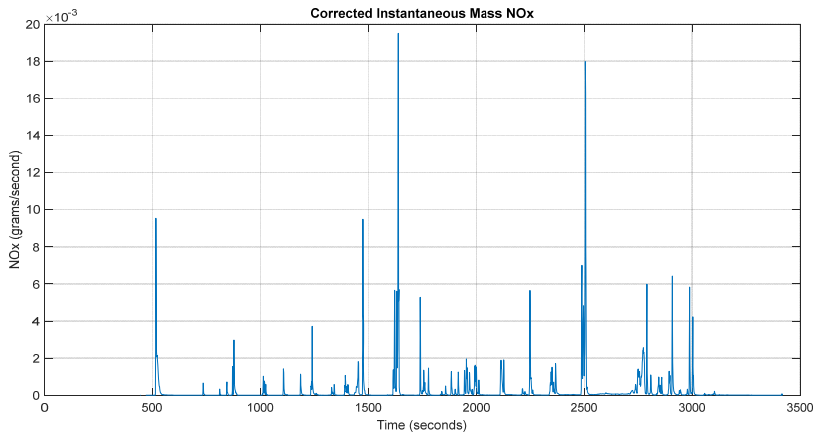


Figure 6.3.4: Vehicle 6 – Transient Cycle Corrected Instantaneous Mass NOx

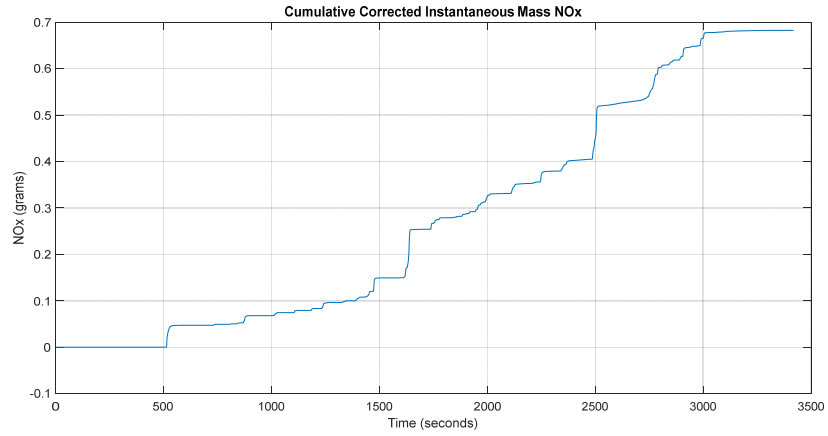


Figure 6.3.5: Vehicle 6 – Transient Cycle Cumulative Corrected Instantaneous Mass NO_x

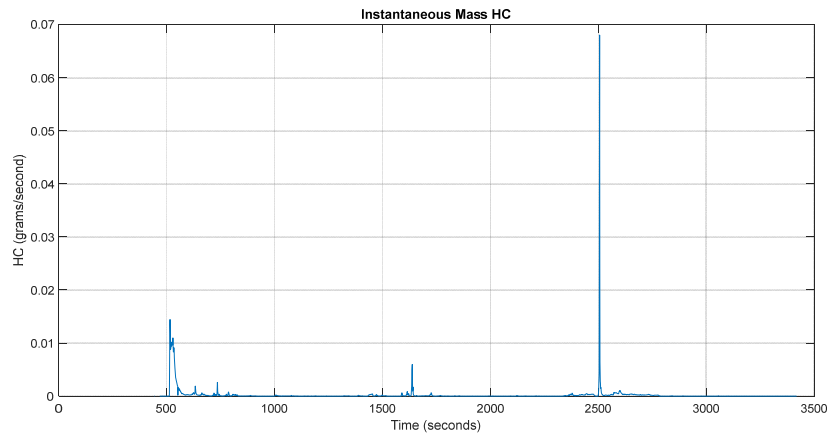


Figure 6.3.6: Vehicle 6 – Transient Cycle Instantaneous Mass HC

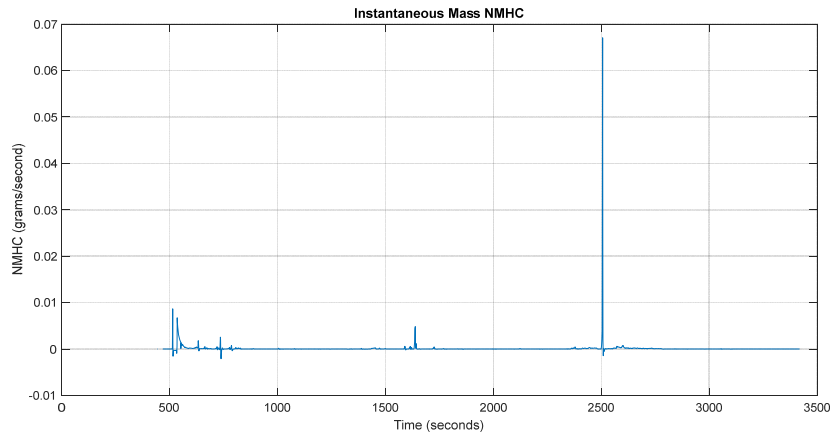


Figure 6.3.7: Vehicle 6 – Transient Cycle Instantaneous Mass NMHC

7. **Vehicle 7 – MCRXT06.45P1 – V0WDE9617**
6.4L Dodge Durango SRT 392 AWD

a. **Summary Table(s)**

Steady State	NOx (g/mi)	CO2 (g/mi)	CO (g/mi)	NMHC (g/mi)	HC (g/mi)
30	0.0083	310.0940	0.1002	0.0012	0.0012
50	0.0127	317.3471	0.0719	0.0022	0.0022
60	0.0273	377.7099	0.2388	0.0168	0.0196
65	0.0782	410.5924	0.2576	0.0093	0.0104
70	0.0239	451.5133	0.1296	0.0027	0.0029
65	0.0809	408.2142	0.2531	0.0088	0.0099
75	0.0296	470.8421	0.1974	0.0036	0.0039
80	0.0431	510.3783	0.0956	0.0038	0.0040
85	0.0444	542.4808	0.2747	0.0048	0.0054

Table 7.1: Vehicle 7 – Steady State
File: V1WDE9617_SSPEMS010321062980.pems.csv

80 MPH Steady State Cruise	NOx (g/mi)	CO2 (g/mi)	CO (g/mi)	NMHC (g/mi)	HC (g/mi)
80	0.0055	448.2517	0.5244	0.0064	0.0167

Table 7.2: Vehicle 7 – 80 MPH Steady State Cruise
File: V1WDE9617_80SS45010421062580.pems.csv

Transient Cycle	NOx (g/mi)	CO2 (g/mi)	CO (g/mi)	NMHC (g/mi)	HC (g/mi)
Various	0.0445	522.8191	3.1325	0.0252	0.0410

Table 7.3: Vehicle 7 – Transient Cycle
File: V1WDE9617_P-IUVP010321062580.pems.csv

b. Summary Plot(s)

i. Steady State PEMS Test

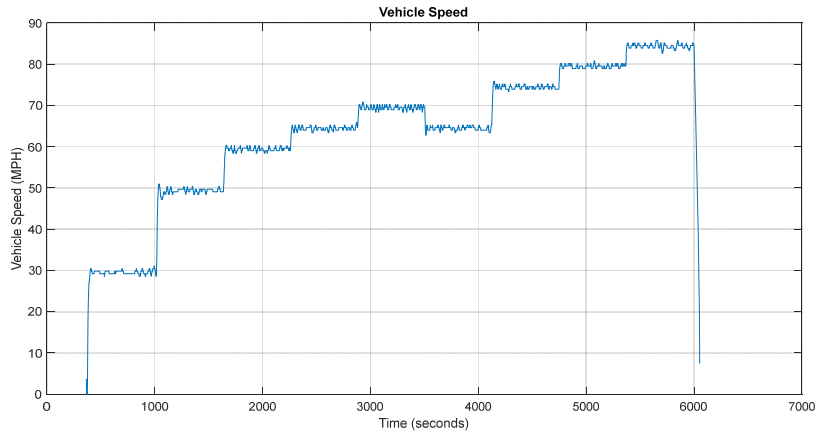


Figure 7.1.1: Vehicle 7 – Steady State Vehicle Speed

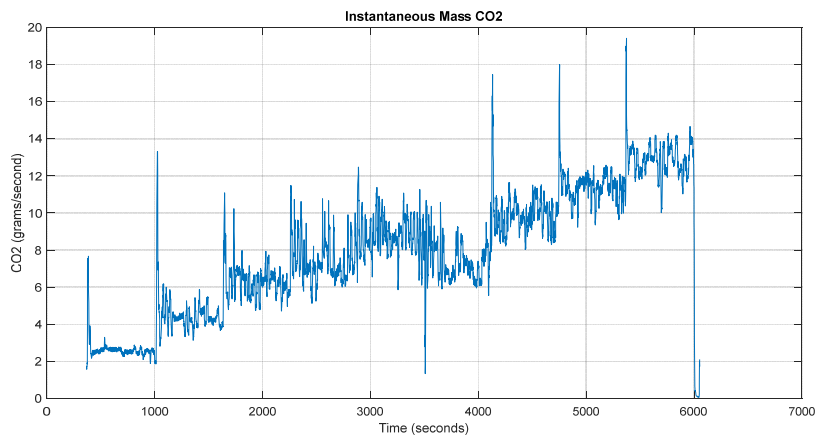


Figure 7.1.2: Vehicle 7 – Steady State Instantaneous Mass CO2

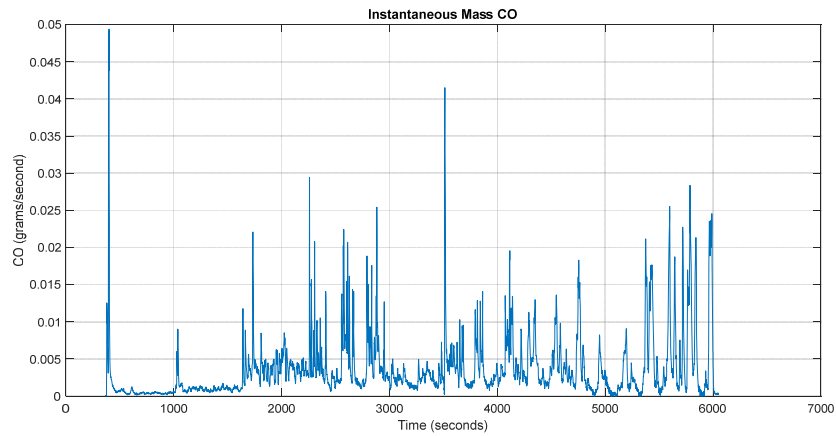


Figure 7.1.3: Vehicle 7 – Steady State Instantaneous Mass CO

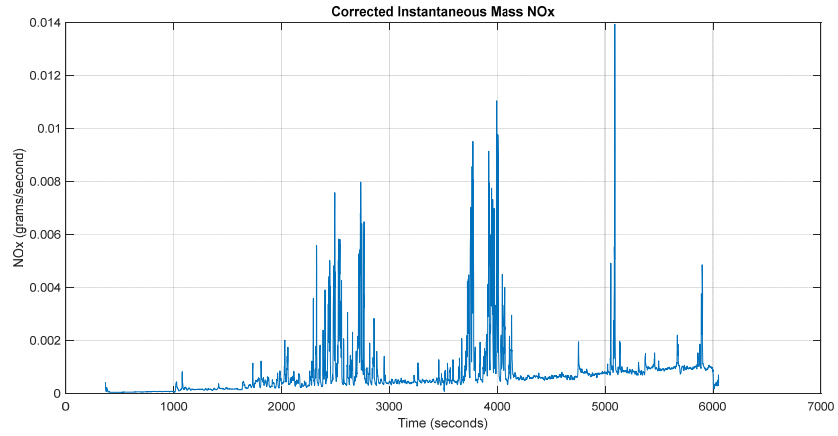


Figure 7.1.4: Vehicle 7 – Steady State Corrected Instantaneous Mass NOx

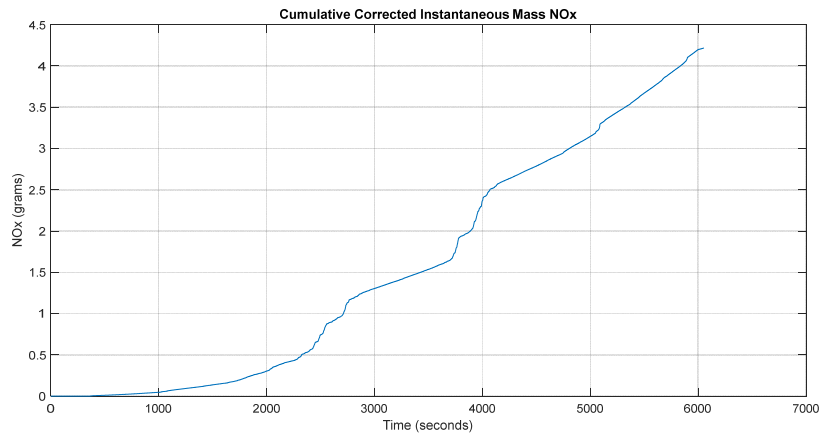


Figure 7.1.5: Vehicle 7 – Steady State Cumulative Corrected Instantaneous Mass NOx

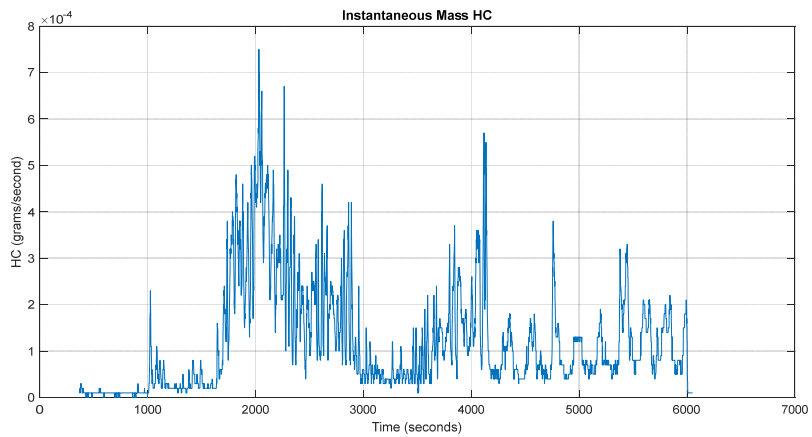


Figure 7.1.6: Vehicle 7 – Steady State Instantaneous Mass HC

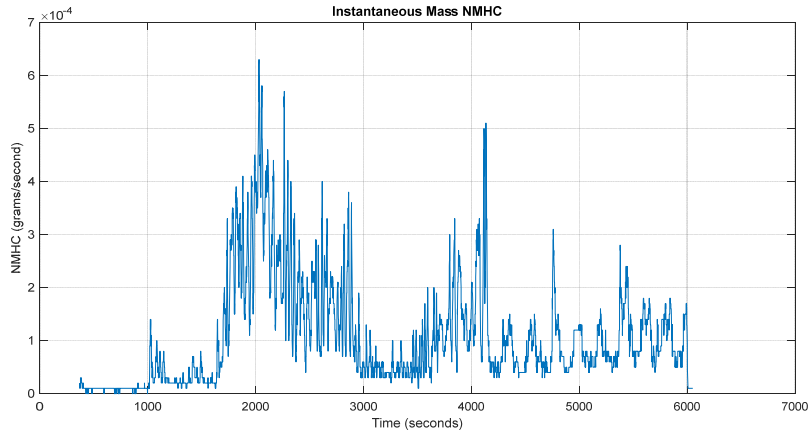


Figure 7.1.7: Vehicle 7 – Steady State Instantaneous Mass NMHC

ii. 80 MPH Steady State Cruise PEMS Test

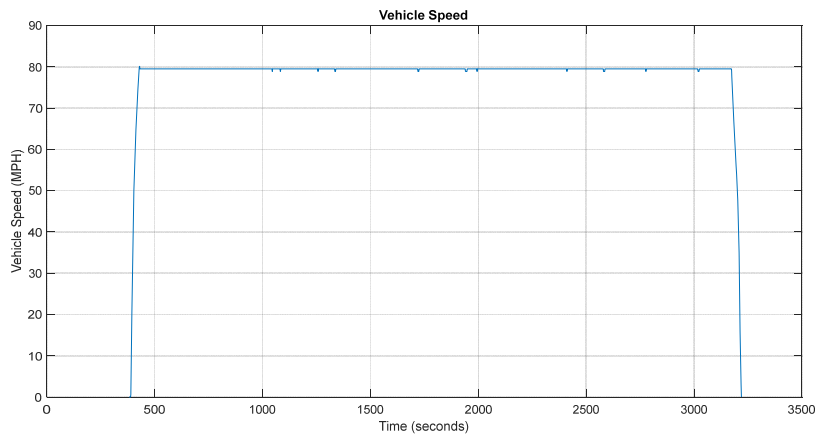


Figure 7.2.1: Vehicle 7 – 80 MPH Steady State Cruise Vehicle Speed

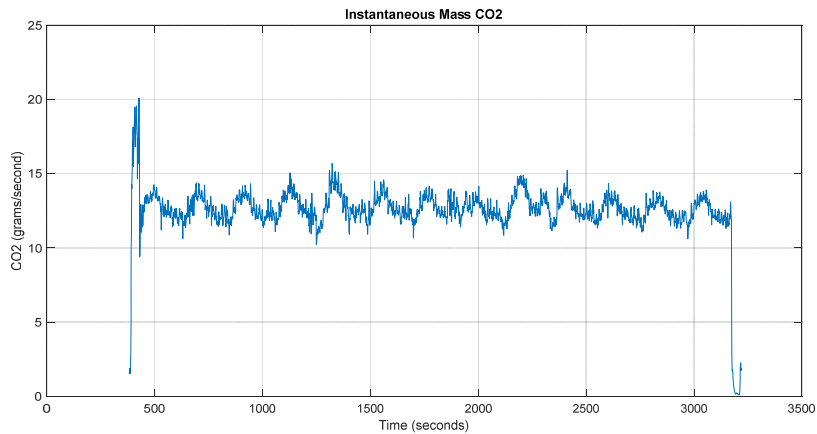


Figure 7.2.2: Vehicle 7 – 80 MPH Steady State Cruise Instantaneous Mass CO2

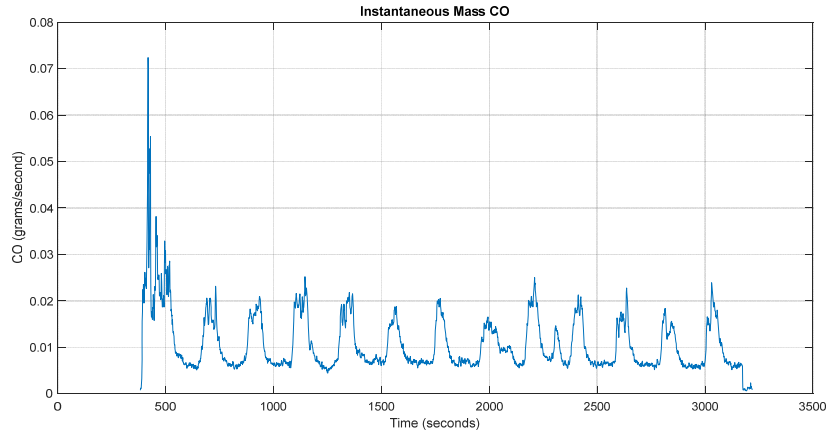


Figure 7.2.3: Vehicle 7 – 80 MPH Steady State Cruise Instantaneous Mass CO

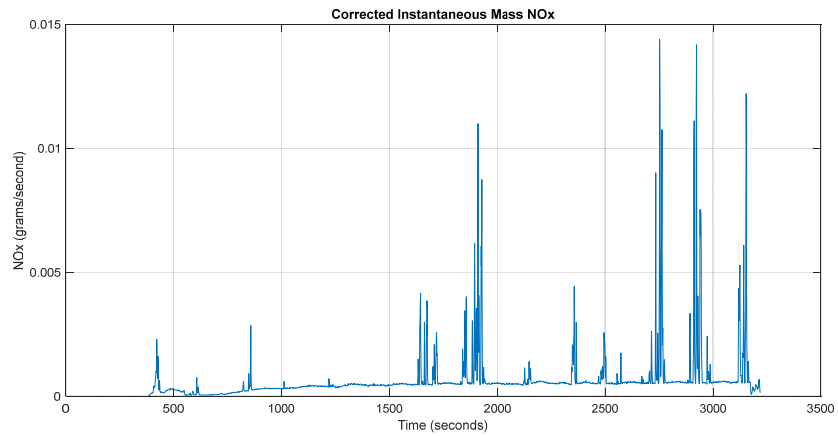


Figure 7.2.4: Vehicle 7 – 80 MPH Steady State Cruise Corrected Instantaneous Mass NOx

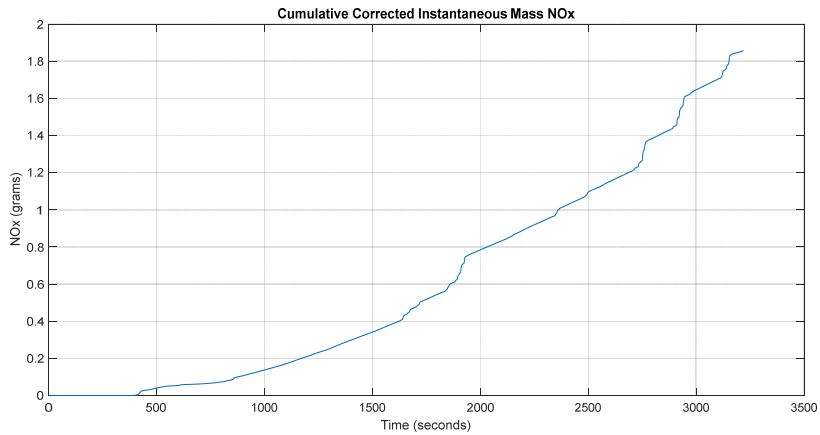


Figure 7.2.5: Vehicle 7 – 80 MPH Steady State Cruise Cumulative Corrected Instantaneous Mass NOx

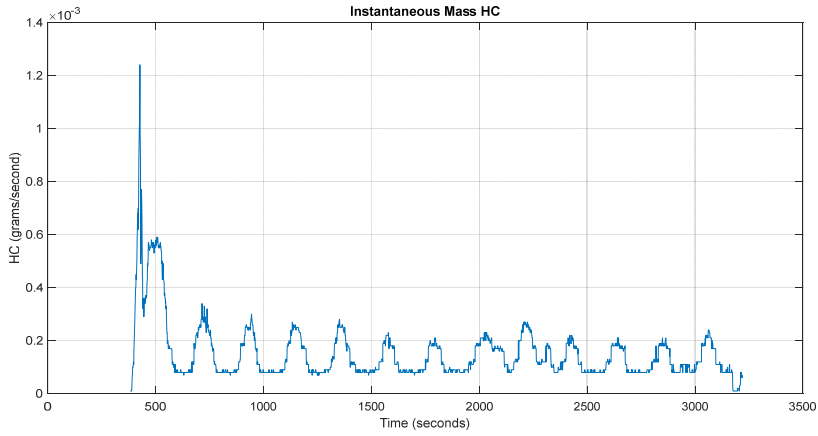


Figure 7.2.6: Vehicle 7 – 80 MPH Steady State Cruise Instantaneous Mass HC

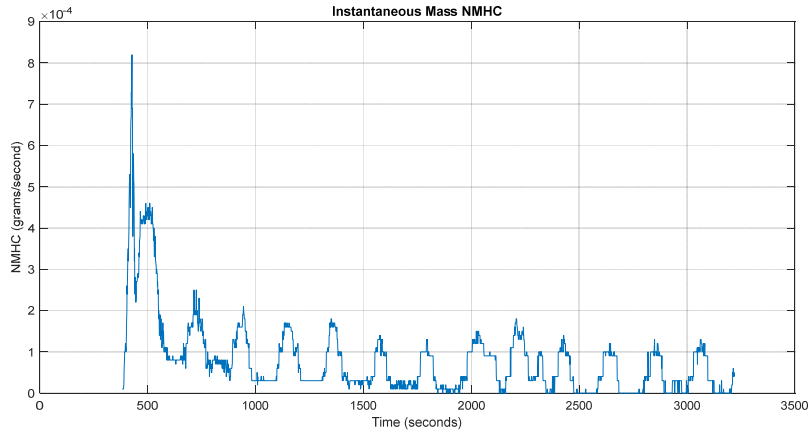


Figure 7.2.7: Vehicle 7 – 80 MPH Steady State Cruise Instantaneous Mass NMHC

iii. Transient Cycle PEMS Test

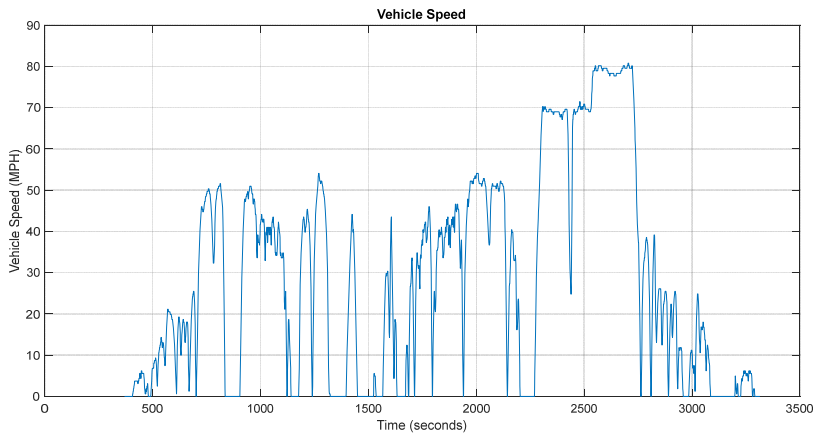


Figure 7.3.1: Vehicle 7 – Transient Cycle Vehicle Speed

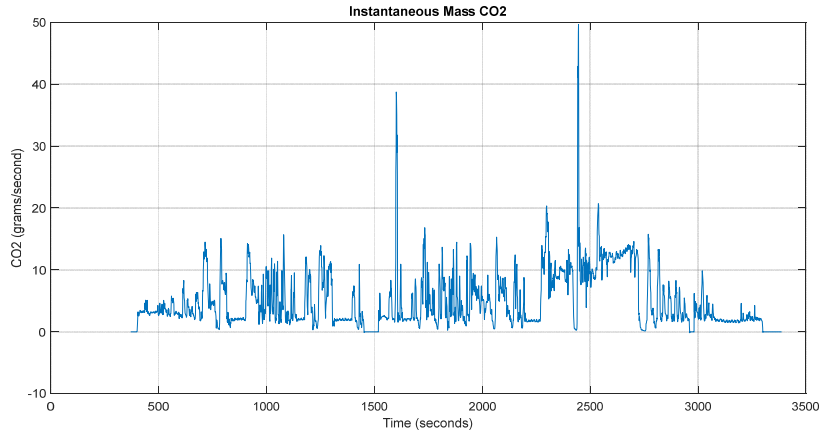


Figure 7.3.2: Vehicle 7 – Transient Cycle Instantaneous Mass CO2

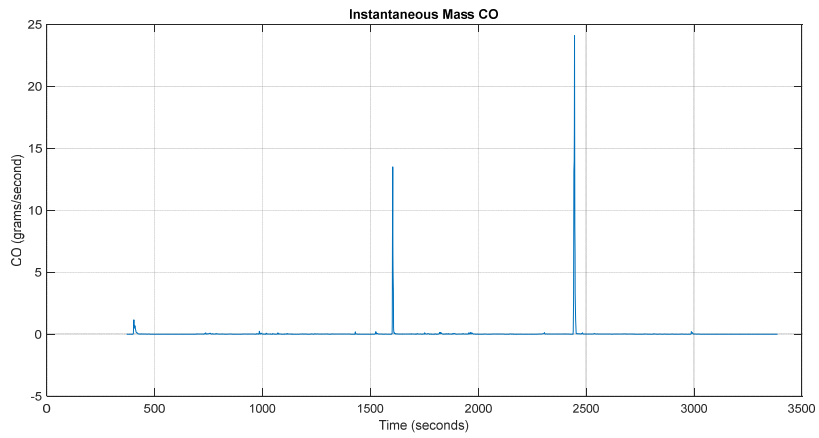


Figure 7.3.3: Vehicle 7 – Transient Cycle Instantaneous Mass CO

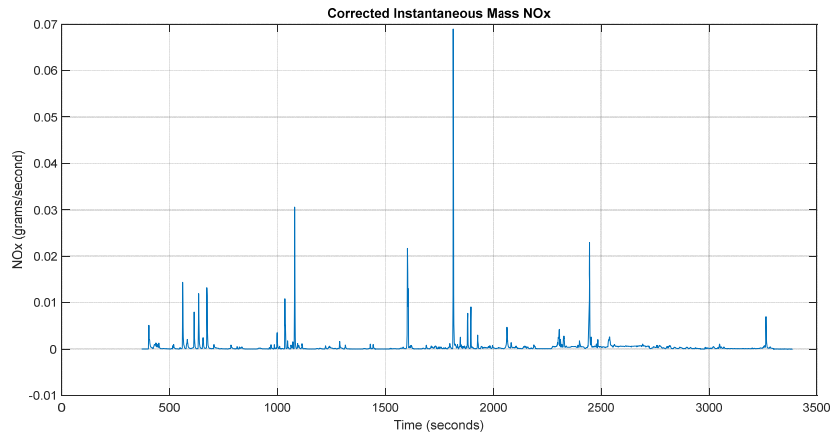


Figure 7.3.4: Vehicle 7 – Transient Cycle Corrected Instantaneous Mass NOx

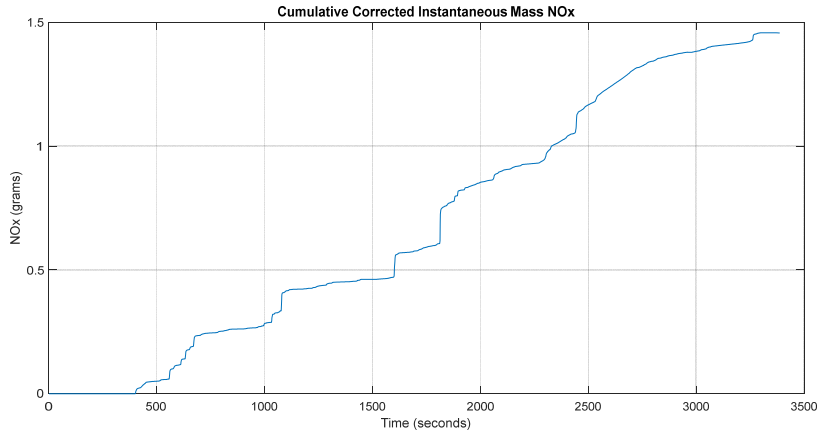


Figure 7.3.5: Vehicle 7 – Transient Cycle Cumulative Corrected Instantaneous Mass NOx

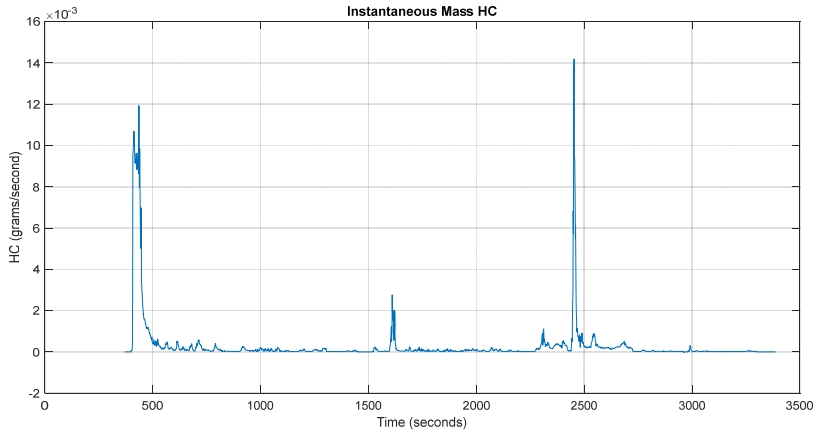


Figure 7.3.6: Vehicle 7 – Transient Cycle Instantaneous Mass HC

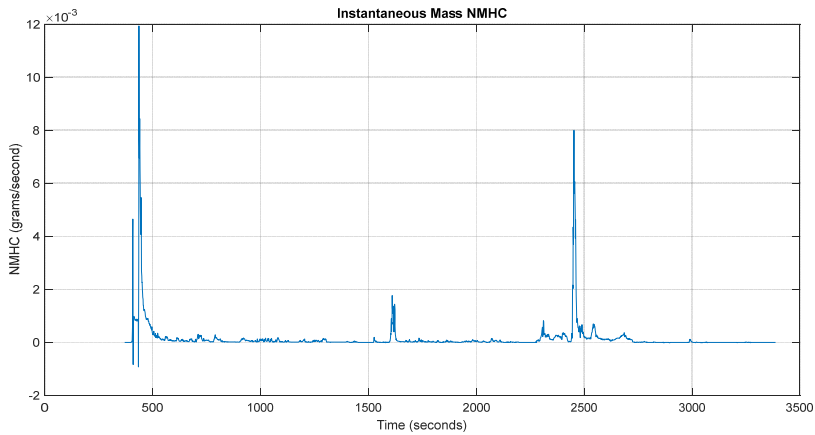


Figure 7.3.7: Vehicle 7 – Transient Cycle Instantaneous Mass NMHC

**8. Vehicle 8 (Retest) – MCRXT03.65P7 – V1DT69272
3.6L BSG RAM 1500 Rebel Crew Cab 4X4**

a. Summary Table(s)

Steady State	NOx (g/mi)	CO2 (g/mi)	CO (g/mi)	NMHC (g/mi)	HC (g/mi)
30	0.0048	317.3426	0.1341	0.0001	0.0002
50	0.0095	358.7138	0.1712	0.0001	0.0001
60	0.0158	416.9211	0.1564	0.0022	0.0022
65	0.0237	437.8295	0.1482	0.0089	0.0093
70	0.0330	486.6494	0.2251	0.0126	0.0135
65	0.0335	438.7205	0.1842	0.0090	0.0097
75	0.0517	552.0438	0.4901	0.0199	0.0225
80	0.0610	597.6803	0.6615	0.0165	0.0184
85	0.0766	688.5691	0.7756	0.0112	0.0125

**Table 8.1: Vehicle 8 (Retest) – Steady State
File: V1DT69272_SSPEMS010121072080.pems.csv**

80 MPH Steady State Cruise	NOx (g/mi)	CO2 (g/mi)	CO (g/mi)	NMHC (g/mi)	HC (g/mi)
80	0.0450	582.7166	0.5156	0.0145	0.0163

**Table 8.2: Vehicle 8 (Retest) – 80 MPH Steady State Cruise
File: V1DT69272_80SS45010221072180.pems.csv**

Transient Cycle	NOx (g/mi)	CO2 (g/mi)	CO (g/mi)	NMHC (g/mi)	HC (g/mi)
Various	0.0310	349.2221	3.8700	0.0180	0.0402

**Table 8.3: Vehicle 8 (Retest) – Transient Cycle
File: V1DT69272_P-IUVP010121072180.pems.csv**

b. Summary Plot(s)

i. Steady State PEMS Test

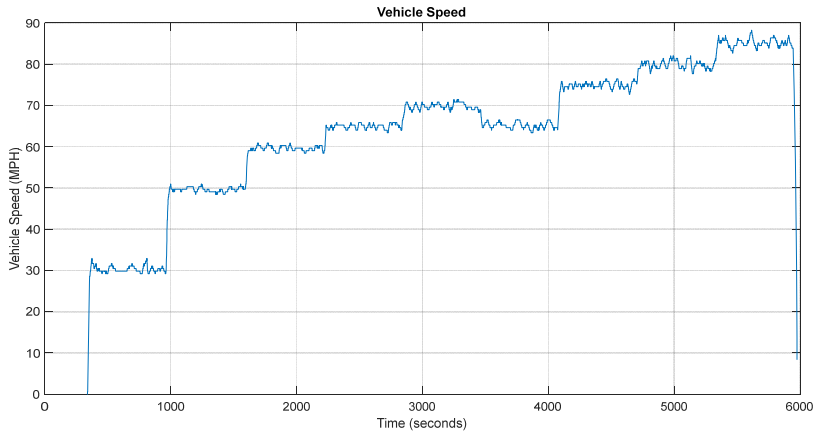


Figure 8.1.1: Vehicle 8 (Retest) – Steady State Vehicle Speed

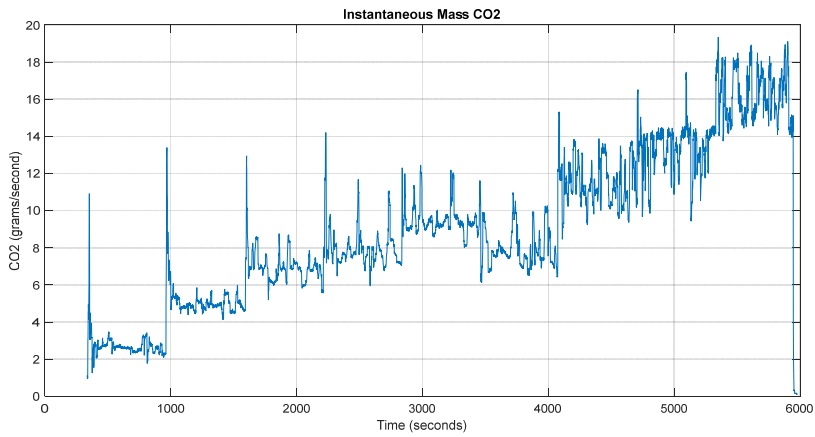


Figure 8.1.2: Vehicle 8 (Retest) – Steady State Instantaneous Mass CO2

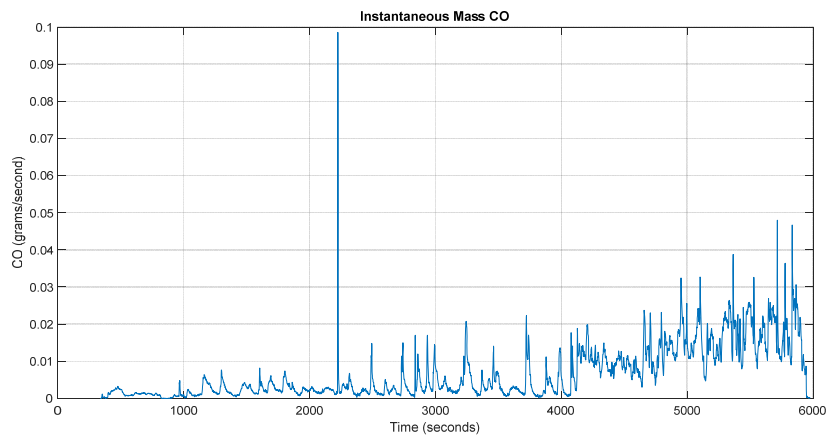


Figure 8.1.3: Vehicle 8 (Retest) – Steady State Instantaneous Mass CO

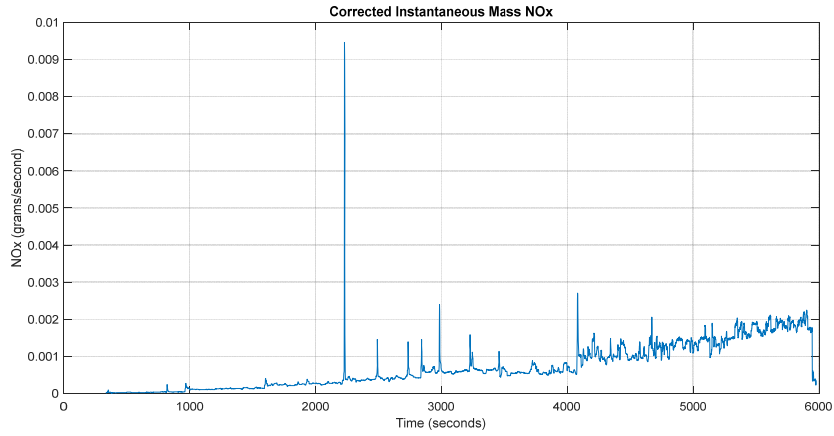


Figure 8.1.4: Vehicle 8 (Retest) – Steady State Corrected Instantaneous Mass NOx

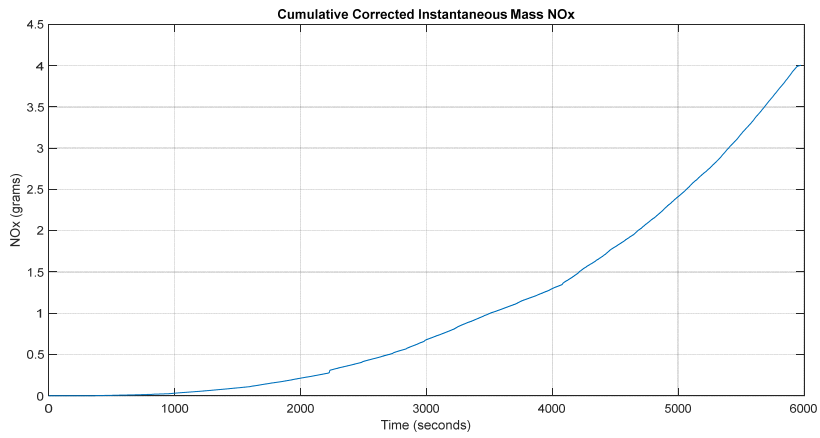


Figure 8.1.5: Vehicle 8 (Retest) – Steady State Cumulative Corrected Instantaneous Mass NOx

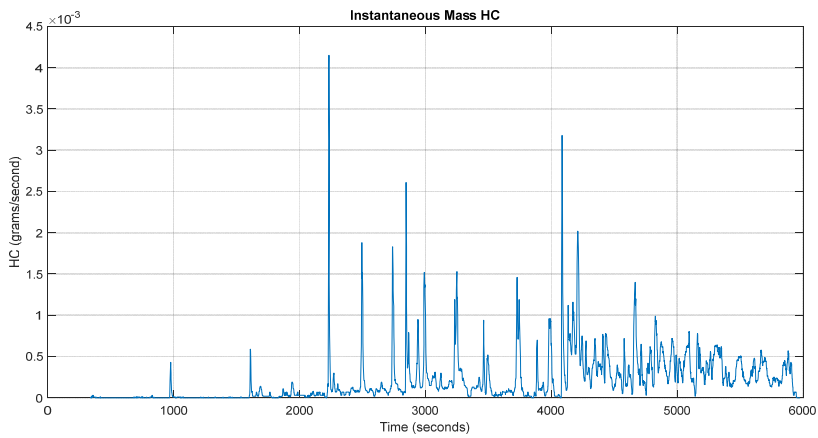


Figure 8.1.6: Vehicle 8 (Retest) – Steady State Instantaneous Mass HC

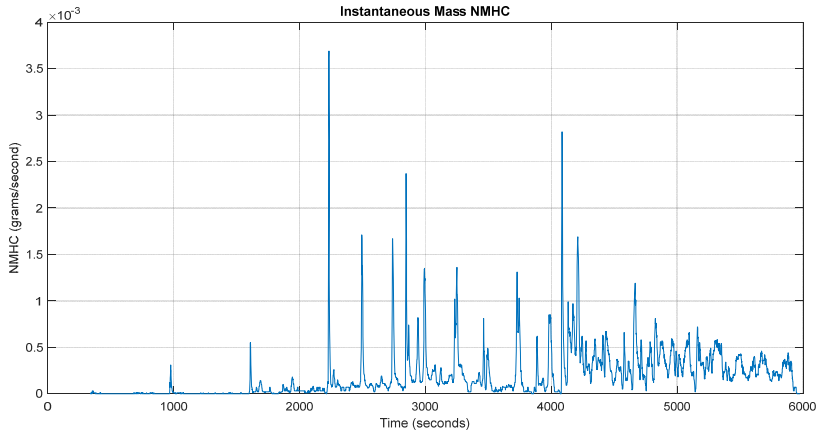


Figure 8.1.7: Vehicle 8 (Retest) – Steady State Instantaneous Mass NMHC

ii. 80MPH Steady State Cruise PEMS Test

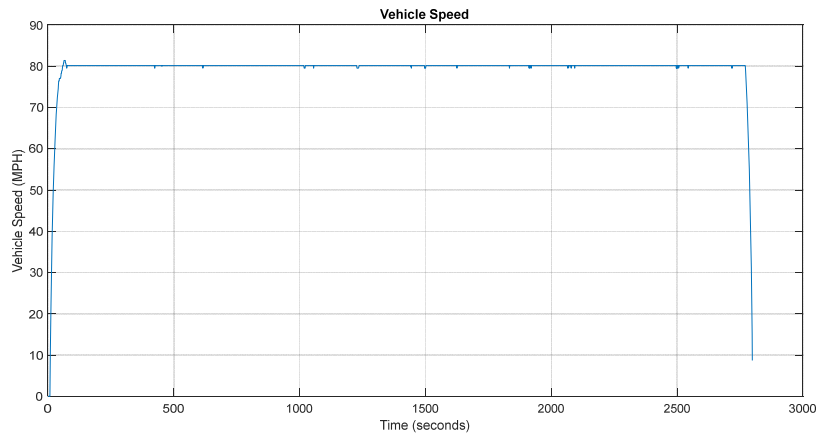


Figure 8.2.1: Vehicle 8 (Retest) – 80 MPH Steady State Cruise Vehicle Speed

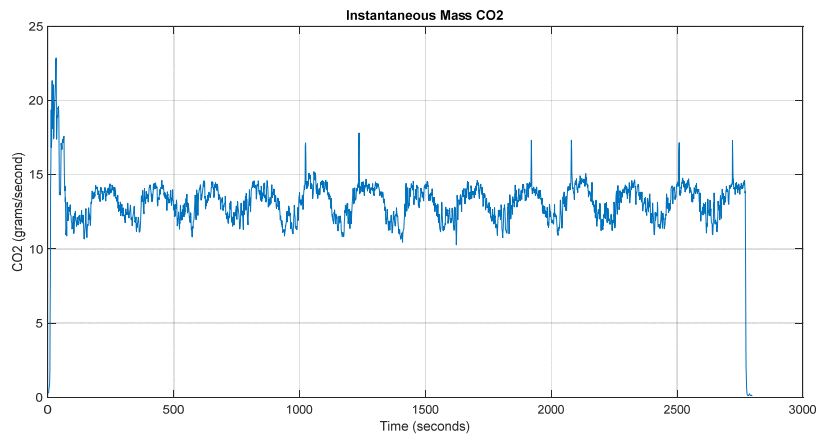


Figure 8.2.2: Vehicle 8 (Retest) – 80 MPH Steady State Cruise Instantaneous Mass CO2

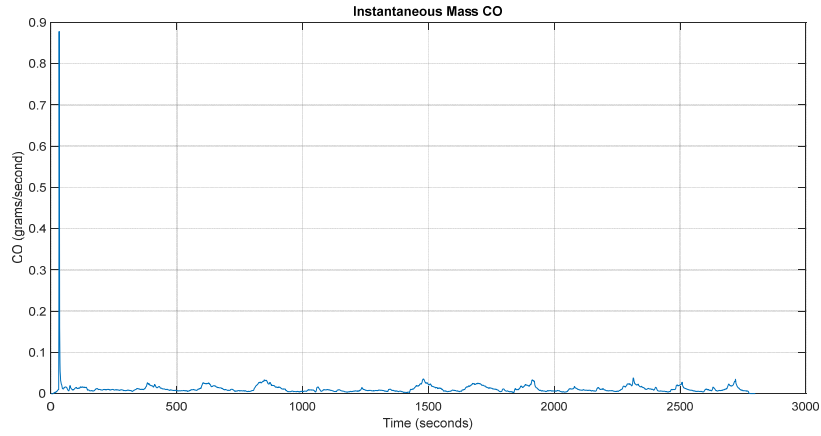


Figure 8.2.3: Vehicle 8 (Retest) – 80 MPH Steady State Cruise Instantaneous Mass CO

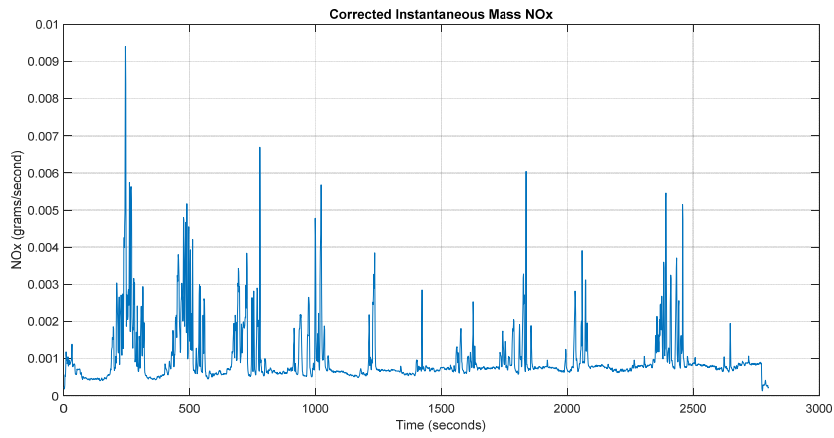


Figure 8.2.4: Vehicle 8 (Retest) – 80 MPH Steady State Cruise Corrected Instantaneous Mass NOx

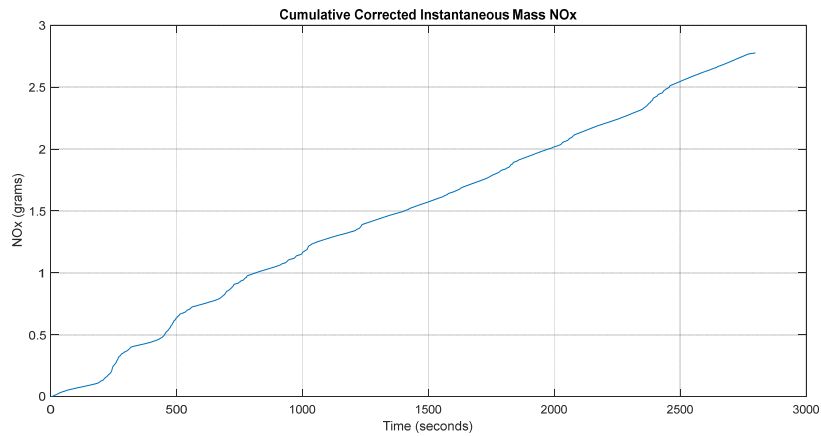


Figure 8.2.5: Vehicle 8 (Retest) – 80 MPH Steady State Cruise Cumulative Corrected Instantaneous Mass NOx

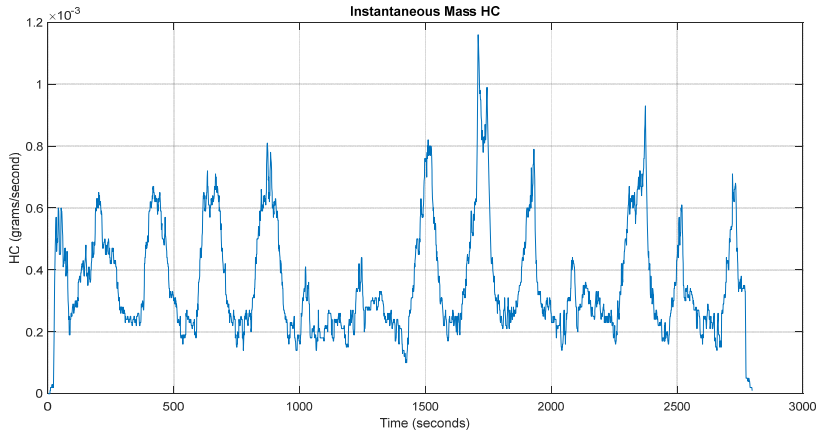


Figure 8.2.6: Vehicle 8 (Retest) – 80 MPH Steady State Cruise Instantaneous Mass HC

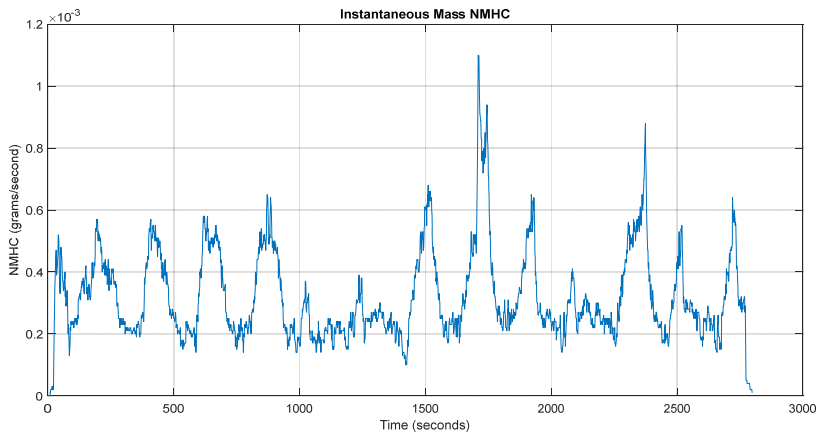


Figure 8.2.7: Vehicle 8 (Retest) – 80 MPH Steady State Cruise Instantaneous Mass NMHC

iii. Transient Cycle PEMS Test

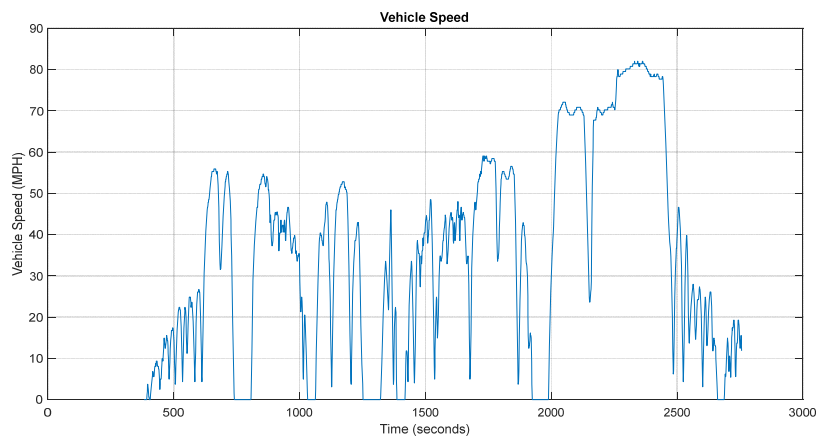


Figure 8.3.1: Vehicle 8 (Retest) – Transient Cycle Vehicle Speed

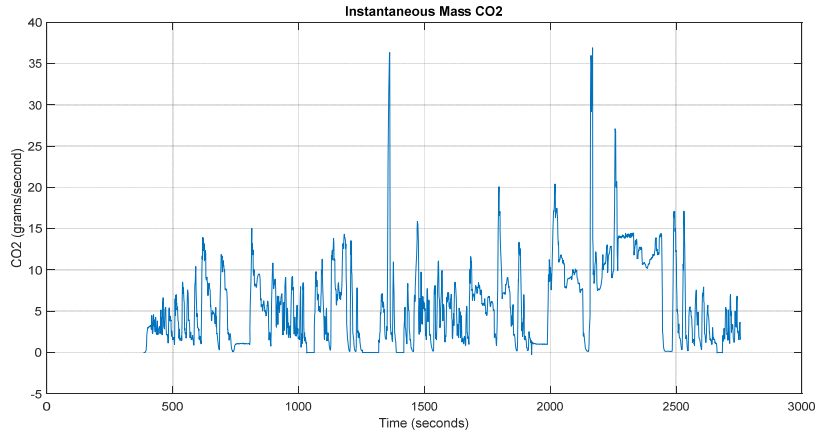


Figure 8.3.2: Vehicle 8 (Retest) – Transient Cycle Instantaneous Mass CO2

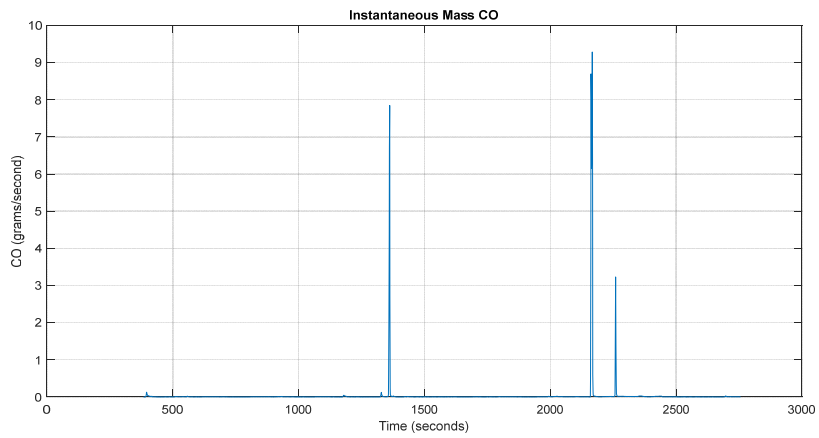


Figure 8.3.3: Vehicle 8 (Retest) – Transient Cycle Instantaneous Mass CO

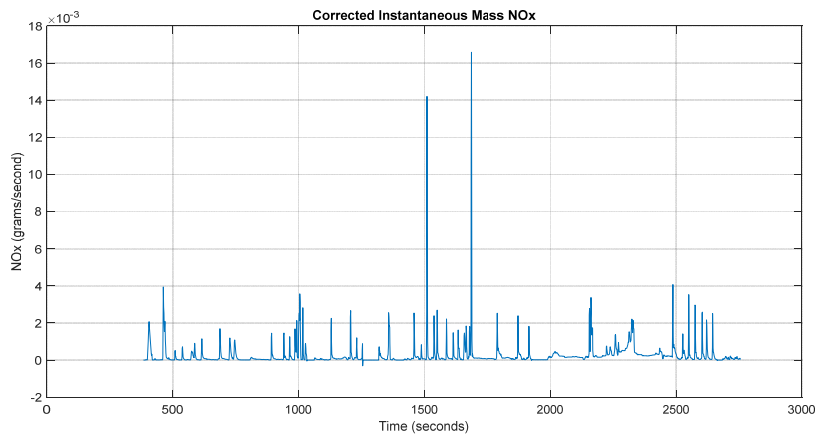


Figure 8.3.4: Vehicle 8 (Retest) – Transient Cycle Corrected Instantaneous Mass NOx

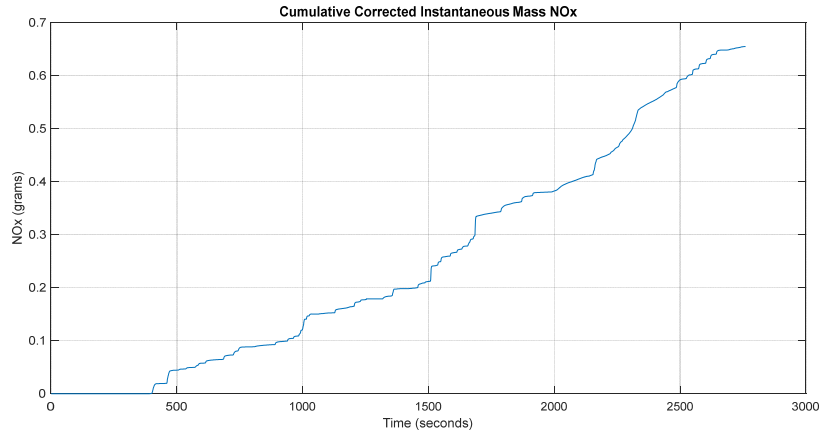


Figure 8.3.5: Vehicle 8 (Retest) – Transient Cycle Cumulative Corrected Instantaneous Mass NOx

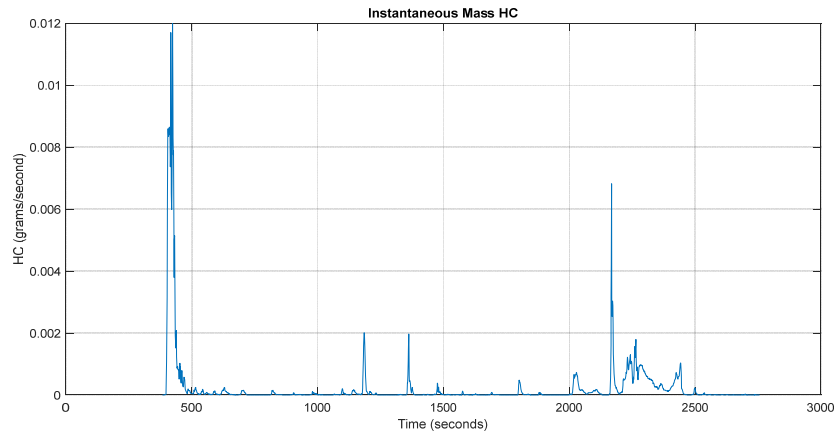


Figure 8.3.6: Vehicle 8 (Retest) – Transient Cycle Instantaneous Mass HC

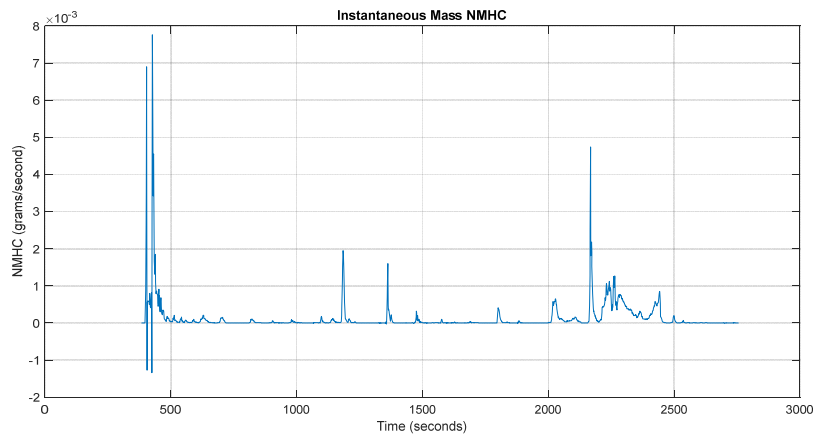


Figure 8.3.7: Vehicle 8 (Retest) – Transient Cycle Instantaneous Mass NMHC

**9. Vehicle 9 – MCRXT02.05P0 – V1KLJ7171
2.0L Jeep Cherokee Limited 4X4**

a. Summary Table(s)

Steady State	NOx (g/mi)	CO2 (g/mi)	CO (g/mi)	NMHC (g/mi)	HC (g/mi)
30	0.0000	225.1174	0.1361	0.0000	0.0000
50	0.0007	309.9010	0.1856	0.0000	0.0000
60	0.0016	360.0835	0.2257	0.0000	0.0000
65	0.0023	397.6128	0.2850	0.0000	0.0000
70	0.0036	391.0033	0.2319	-0.0007	0.0009
65	0.0038	398.7575	0.2885	-0.0008	0.0002
75	0.0038	381.1906	0.2714	-0.0011	0.0002
80	0.0044	395.4696	0.3192	-0.0007	0.0000
85	0.0057	434.9040	0.3570	-0.0004	0.0000

**Table 9.1: Vehicle 9 – Steady State
File: V1KLJ7171_SSPEMS010321080480.pems.csv**

80 MPH Steady State Cruise	NOx (g/mi)	CO2 (g/mi)	CO (g/mi)	NMHC (g/mi)	HC (g/mi)
80	0.0013	397.2914	0.3231	0.0003	0.0005

**Table 9.2: Vehicle 9 – 80 MPH Steady State Cruise
File: V1KLJ7171_80SS45010421080480.pems.csv**

Transient Cycle	NOx (g/mi)	CO2 (g/mi)	CO (g/mi)	NMHC (g/mi)	HC (g/mi)
Various	0.0230	457.2738	4.0992	0.0117	0.0170

**Table 9.3: Vehicle 9 – Transient Cycle
File: V1KLJ7171_P-IUVP010221080480.pems.csv**

b. Summary Plot(s)

i. Steady State PEMS Test

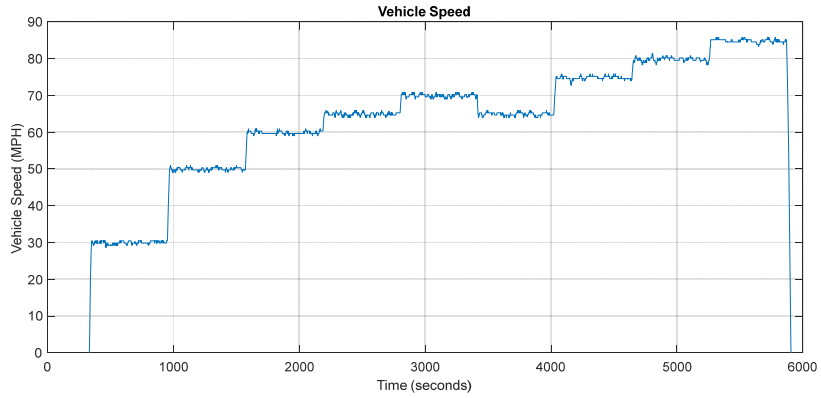


Figure 9.1.1: Vehicle 9 – Steady State Vehicle Speed

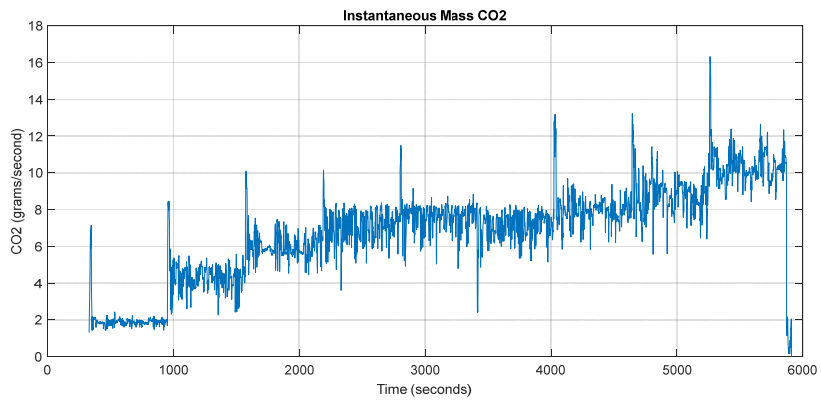


Figure 9.1.2: Vehicle 9 – Steady State Instantaneous Mass CO2

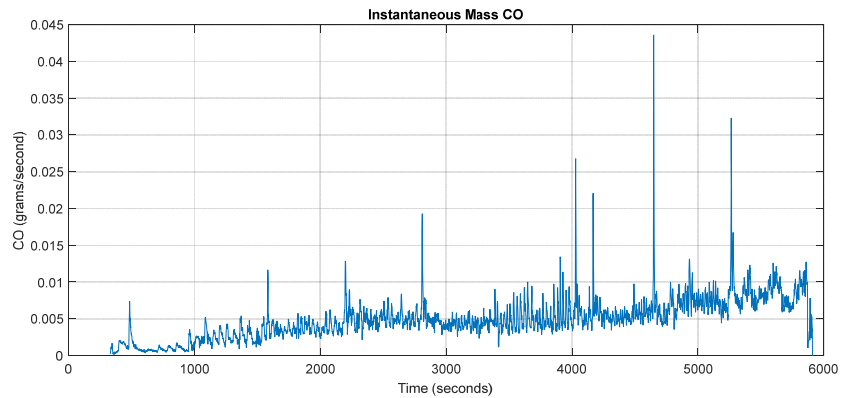


Figure 9.1.3: Vehicle 9 – Steady State Instantaneous Mass CO

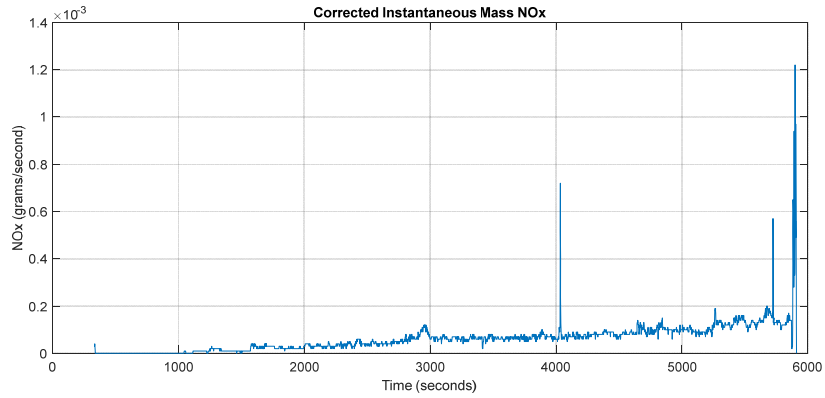


Figure 9.1.4: Vehicle 9 – Steady State Corrected Instantaneous Mass NOx

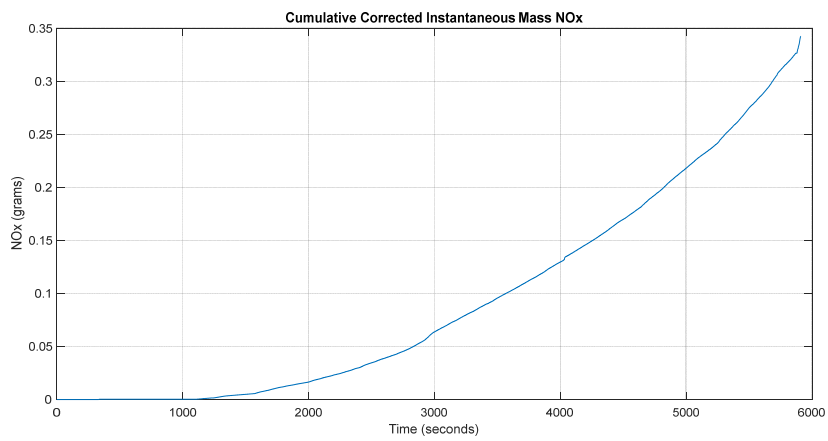


Figure 9.1.5: Vehicle 9 – Steady State Cumulative Corrected Instantaneous Mass NOx

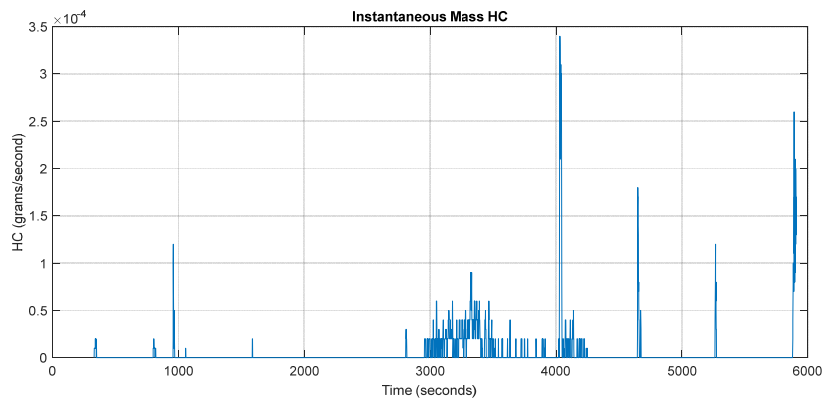


Figure 9.1.6: Vehicle 9 – Steady State Instantaneous Mass HC

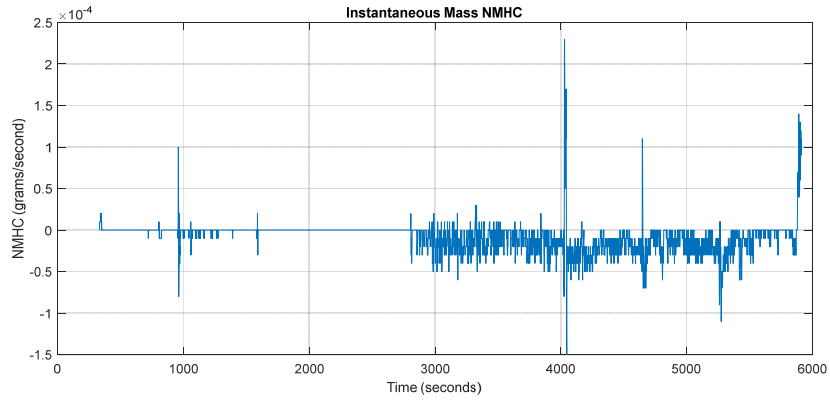


Figure 9.1.7: Vehicle 9 – Steady State Instantaneous Mass NMHC

ii. 80 MPH Steady State Cruise PEMS Test

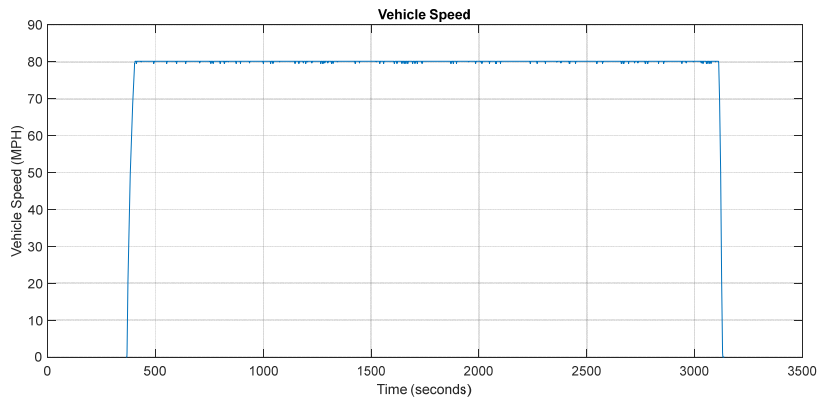


Figure 9.2.1: Vehicle 9 – 80 MPH Steady State Cruise Vehicle Speed

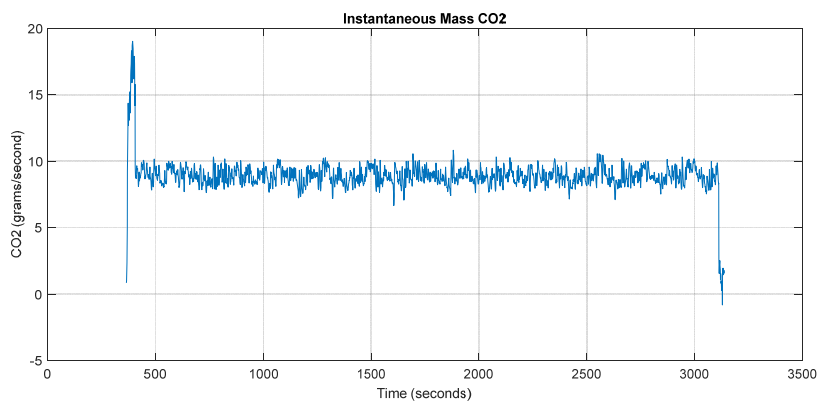


Figure 9.2.2: Vehicle 9 – 80 MPH Steady State Cruise Instantaneous Mass CO2

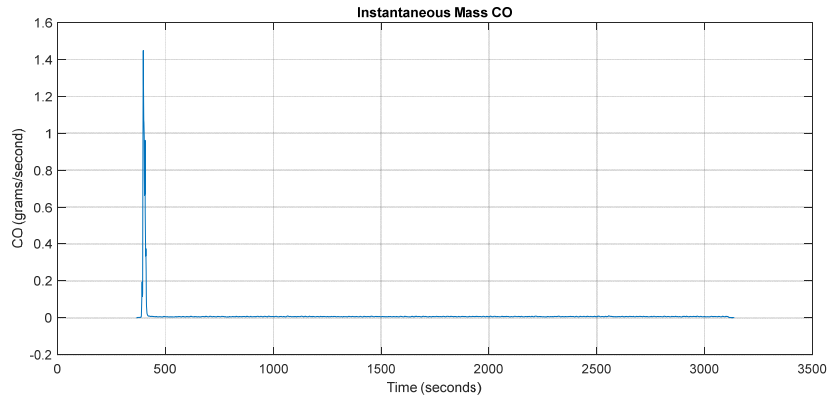


Figure 9.2.3: Vehicle 9 – 80 MPH Steady State Cruise Instantaneous Mass CO

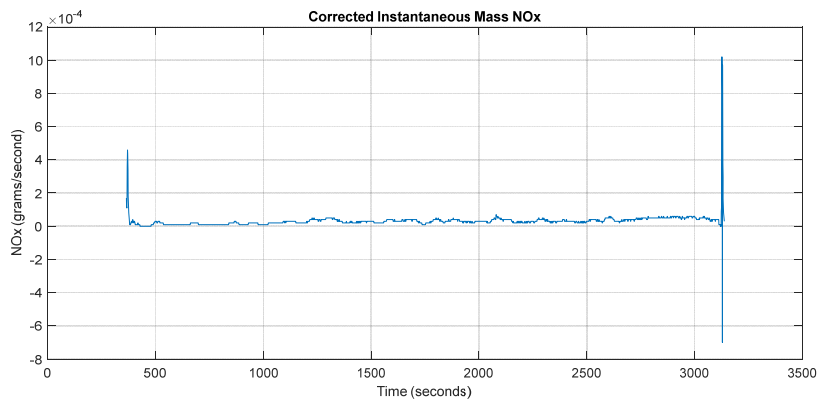


Figure 9.2.4: Vehicle 9 – 80 MPH Steady State Cruise Corrected Instantaneous Mass NOx

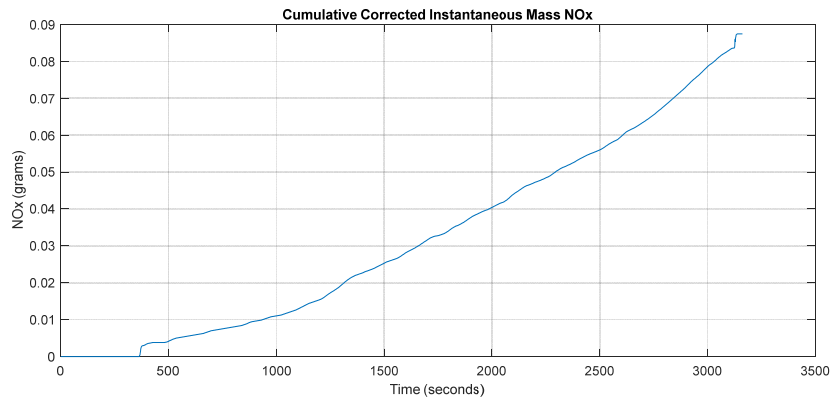


Figure 9.2.5: Vehicle 9 – 80 MPH Steady State Cruise Cumulative Corrected Instantaneous Mass NOx

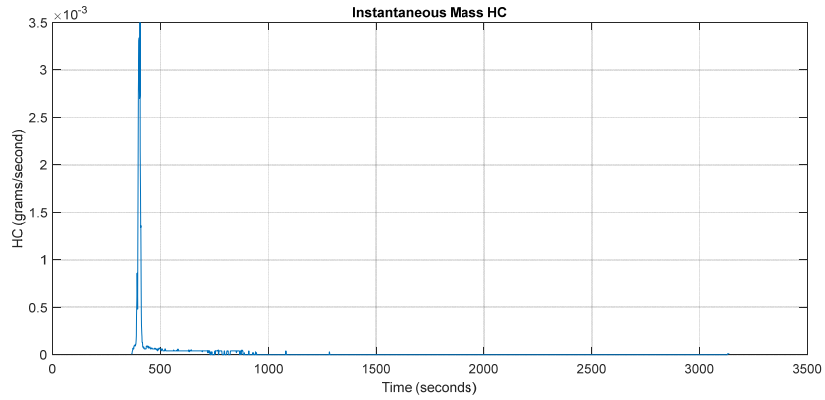


Figure 9.2.6: Vehicle 9 – 80 MPH Steady State Cruise Instantaneous Mass HC

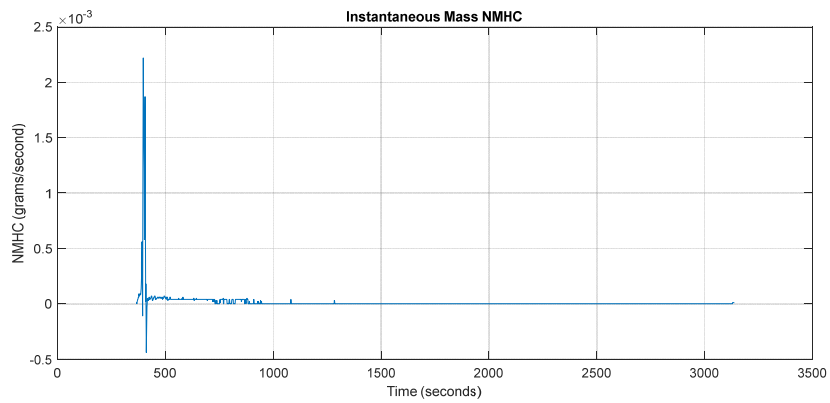


Figure 9.2.7: Vehicle 9 – 80 MPH Steady State Cruise Instantaneous Mass NMHC

iii. Transient Cycle PEMS Test

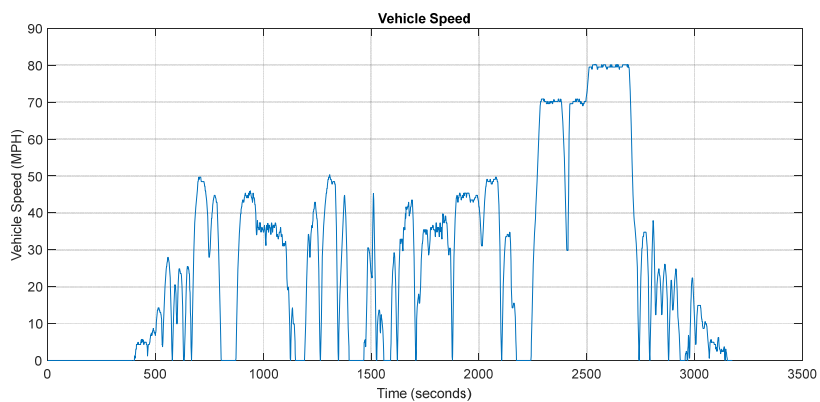


Figure 9.3.1: Vehicle 9 – Transient Cycle Vehicle Speed

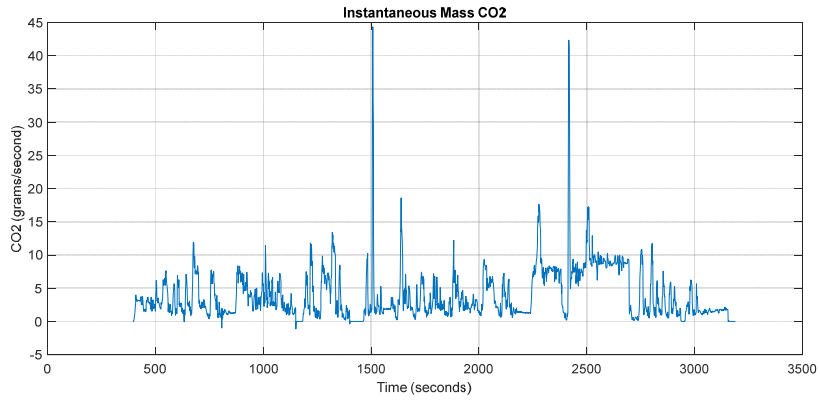


Figure 9.3.2: Vehicle 9 – Transient Cycle Instantaneous Mass CO2

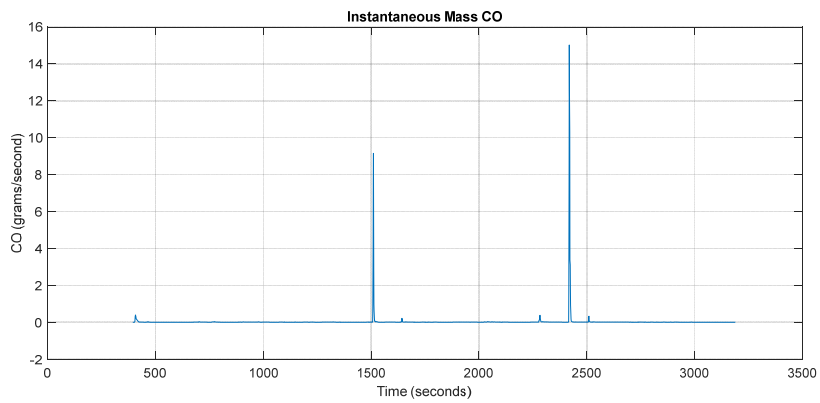


Figure 9.3.3: Vehicle 9 – Transient Cycle Instantaneous Mass CO

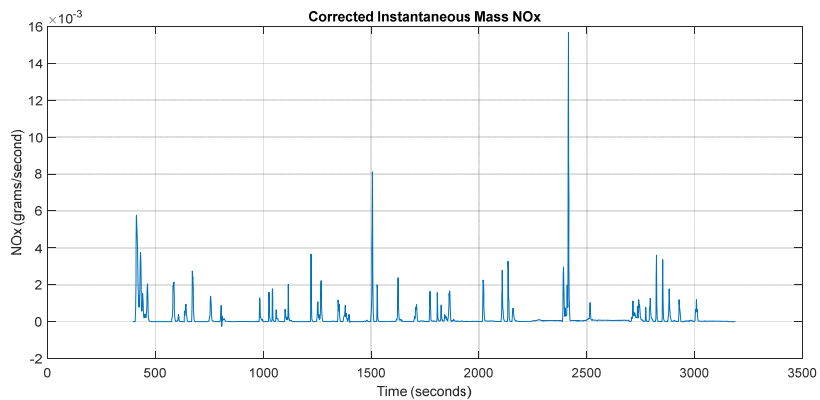


Figure 9.3.4: Vehicle 9 – Transient Cycle Corrected Instantaneous Mass NOx

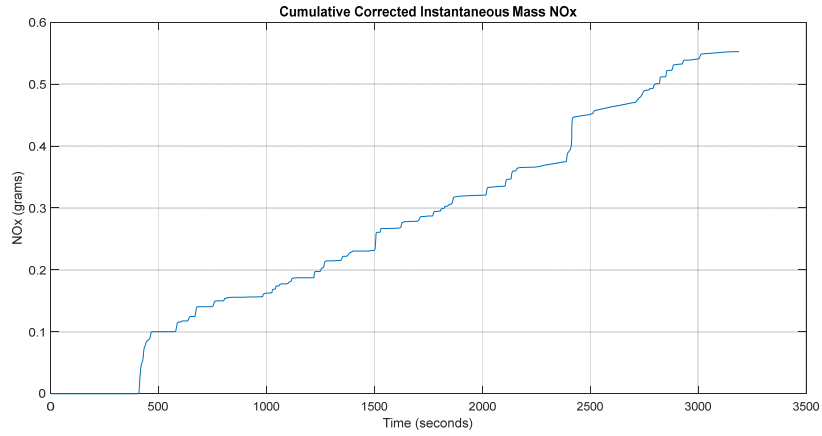


Figure 9.3.5: Vehicle 9 – Transient Cycle Cumulative Corrected Instantaneous Mass NO_x

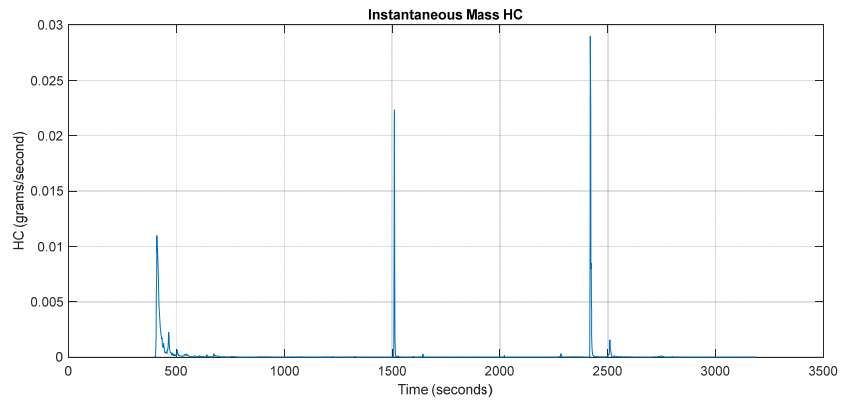


Figure 9.3.6: Vehicle 9 – Transient Cycle Instantaneous Mass HC

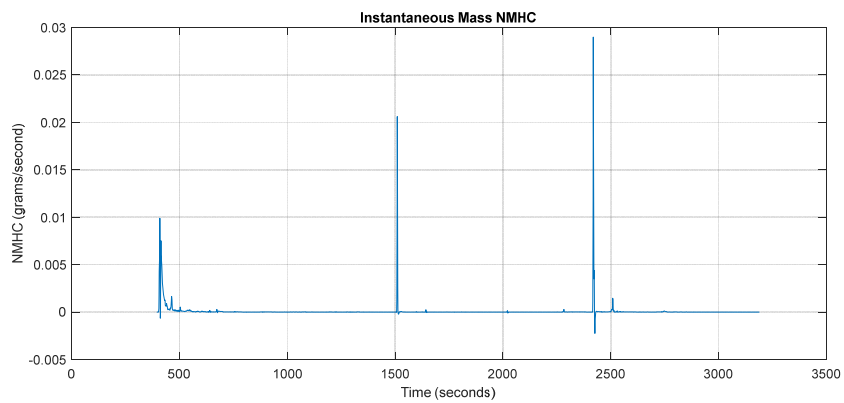


Figure 9.3.7: Vehicle 9 – Transient Cycle Instantaneous Mass NMHC

**10. Vehicle 10 (Retest) – MCRXT05.75P2 – V1DS66323
5.7L RAM 1500 Tradesman Crew Cab 4X4**

a. Summary Table(s)

Steady State	NOx (g/mi)	CO2 (g/mi)	CO (g/mi)	NMHC (g/mi)	HC (g/mi)
30	0.0072	402.6725	0.1263	0.0033	0.0033
50	0.0587	378.0087	0.0907	0.0007	0.0024
60	0.0164	428.3262	0.1200	0.0012	0.0037
65	0.0592	451.4727	0.1327	0.0020	0.0061
70	0.0152	480.0671	0.2876	0.0018	0.0062
65	0.0419	448.7986	0.1027	0.0003	0.0021
75	0.0100	514.1613	0.4178	0.0026	0.0066
80	0.0123	563.6580	0.3892	0.0022	0.0031
85	0.0128	613.4205	0.3412	0.0025	0.0025

**Table 10.1: Vehicle 10 (Retest) – Steady State
File: V1DS66323_SSPEMS010321072280.pems.csv**

80 MPH Steady State Cruise	NOx (g/mi)	CO2 (g/mi)	CO (g/mi)	NMHC (g/mi)	HC (g/mi)
80	0.0170	552.9591	0.5150	0.0001	0.0002

**Table 10.2: Vehicle 10 – 80 MPH Steady State Cruise
File: V1DS66323_80SS45010221071980.pems.csv**

Transient Cycle	NOx (g/mi)	CO2 (g/mi)	CO (g/mi)	NMHC (g/mi)	HC (g/mi)
Various	0.0487	630.1972	3.9471	0.0429	0.0571

**Table 10.3: Vehicle 10 – Transient Cycle
File: V1DS66323_P-IUVP010121071980.pems.csv**

b. Summary Plot(s)

i. Steady State PEMS Test

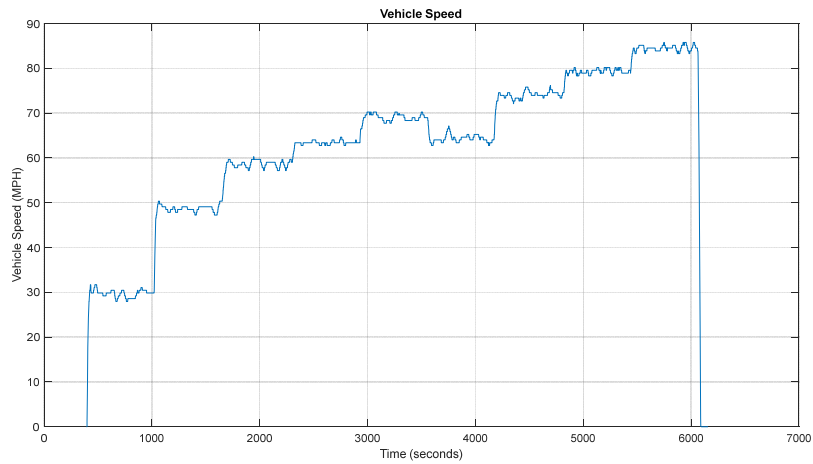


Figure 10.1.1: Vehicle 10 (Retest) – Steady State Vehicle Speed

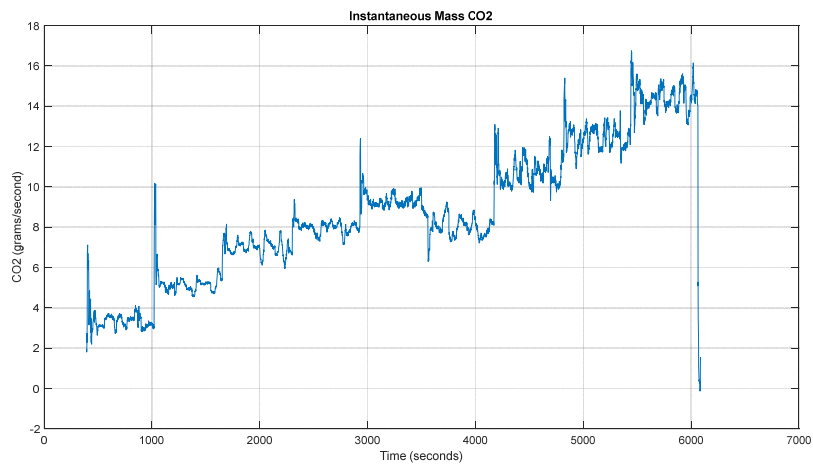


Figure 10.1.2: Vehicle 10 (Retest) – Steady State Instantaneous Mass CO2

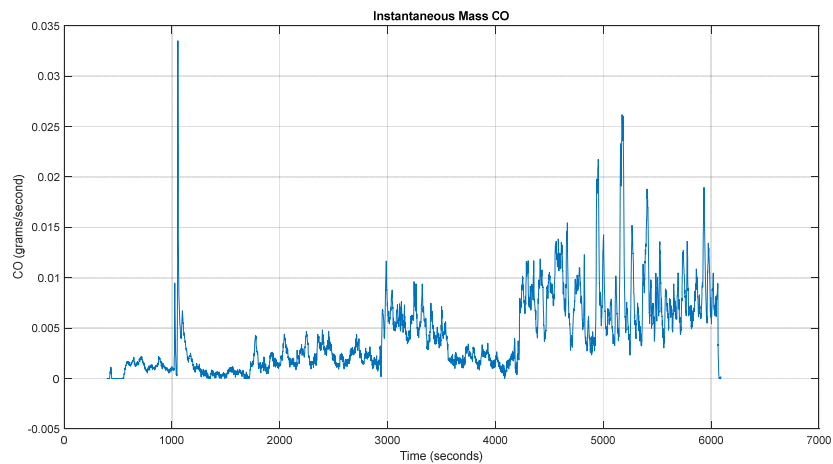


Figure 10.1.3: Vehicle 10 (Retest) – Steady State Instantaneous Mass CO

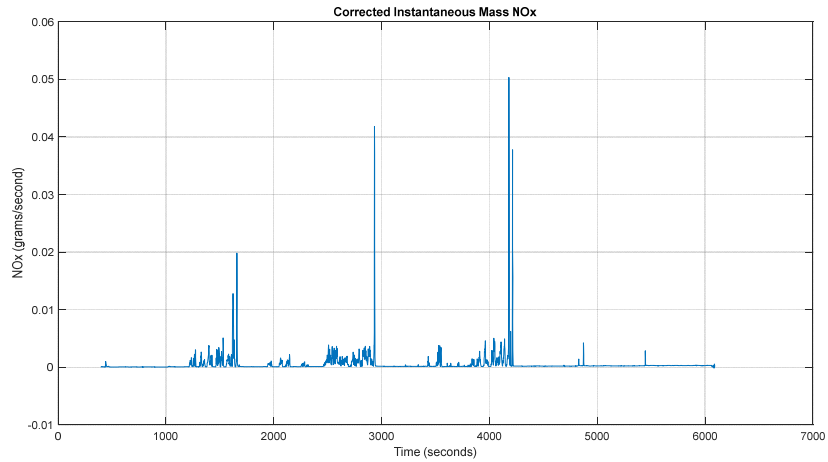


Figure 10.1.4: Vehicle 10 (Retest) – Steady State Corrected Instantaneous Mass NOx

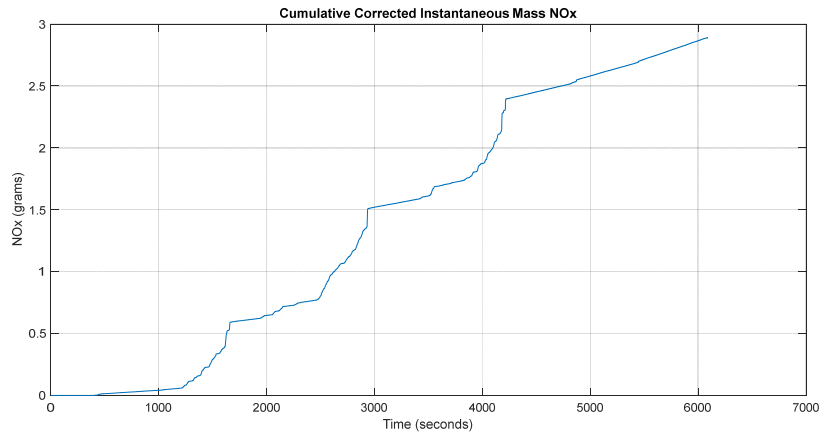


Figure 10.1.5: Vehicle 10 (Retest) – Steady State Cumulative Corrected Instantaneous Mass NOx

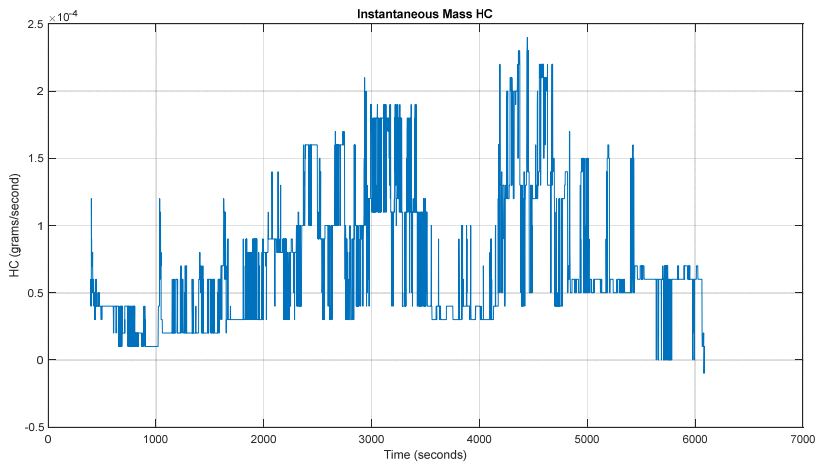


Figure 10.1.6: Vehicle 10 (Retest) – Steady State Instantaneous Mass HC

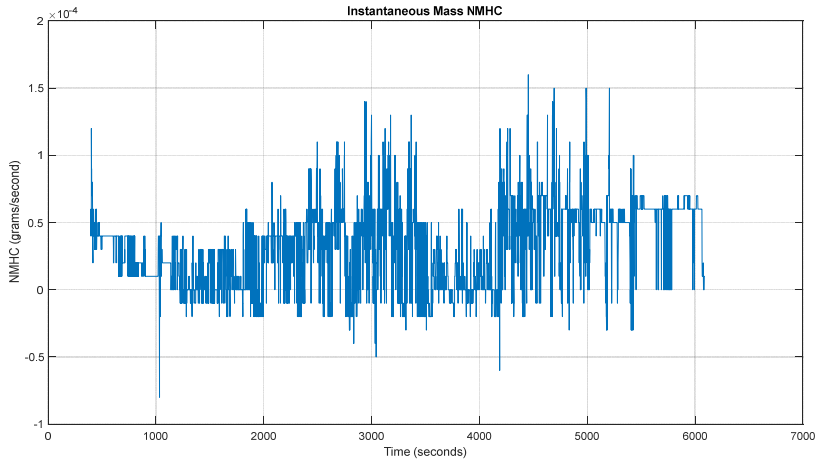


Figure 10.1.7: Vehicle 10 (Retest) – Steady State Instantaneous Mass NMHC

ii. 80MPH Steady State Cruise PEMS Test

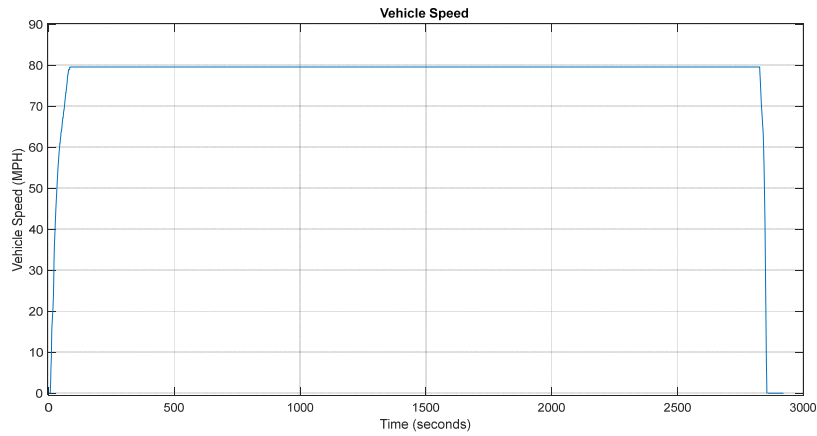


Figure 10.2.1: Vehicle 10 – 80 MPH Steady State Cruise Vehicle Speed

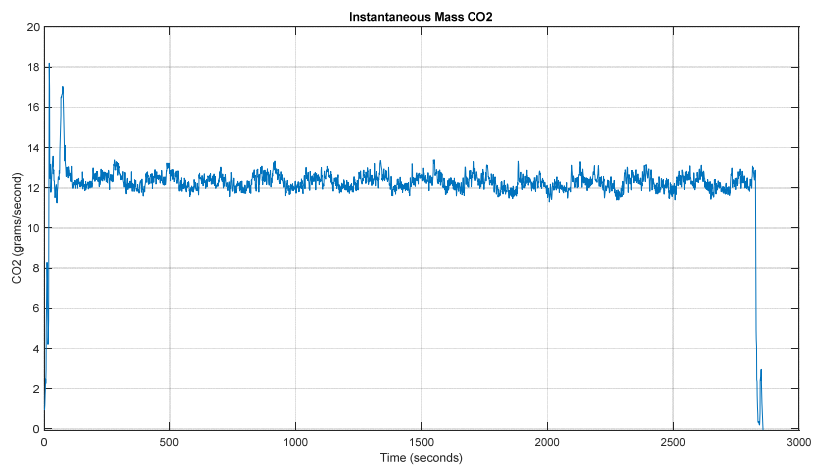


Figure 10.2.2: Vehicle 10 – 80 MPH Steady State Cruise Instantaneous Mass CO₂

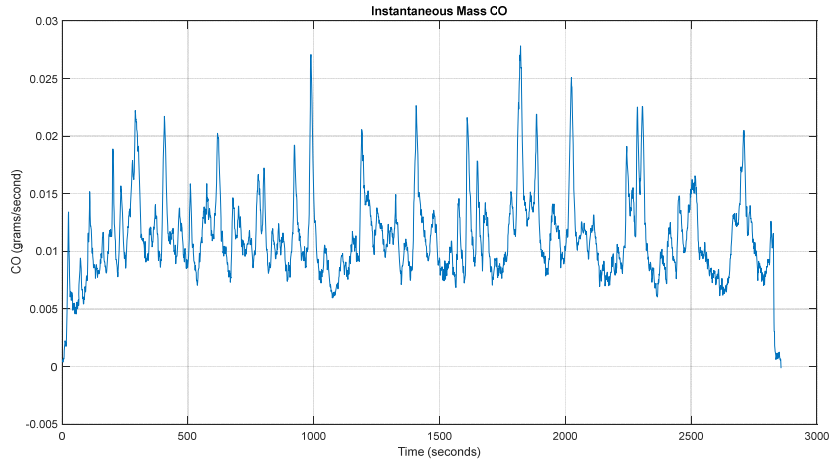


Figure 10.2.3: Vehicle 10 – 80 MPH Steady State Cruise Instantaneous Mass CO

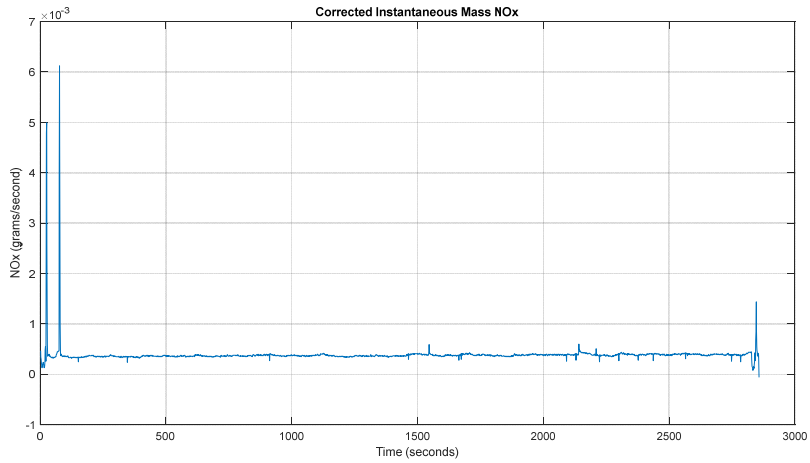


Figure 10.2.4: Vehicle 10 – 80 MPH Steady State Cruise Corrected Instantaneous Mass NOx

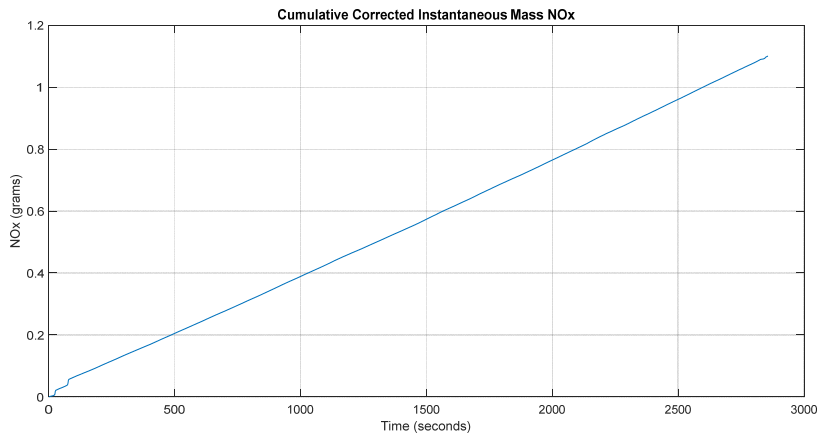


Figure 10.2.5: Vehicle 10 – 80 MPH Steady State Cruise Cumulative Corrected Instantaneous Mass NOx

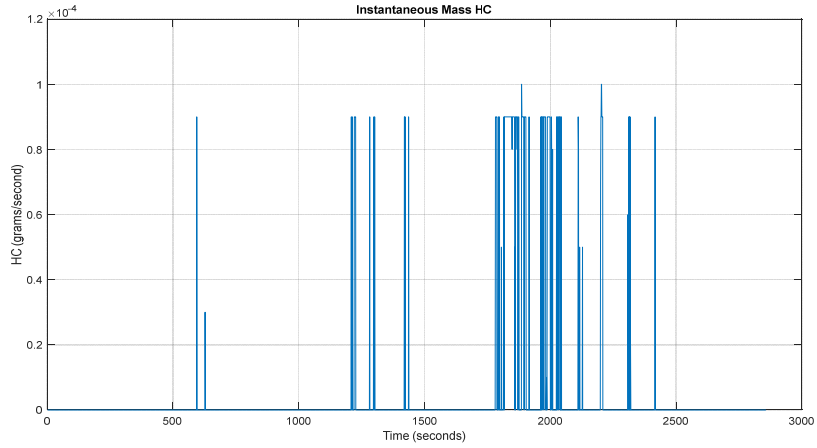


Figure 10.2.6: Vehicle 10 – 80 MPH Steady State Cruise Instantaneous Mass HC

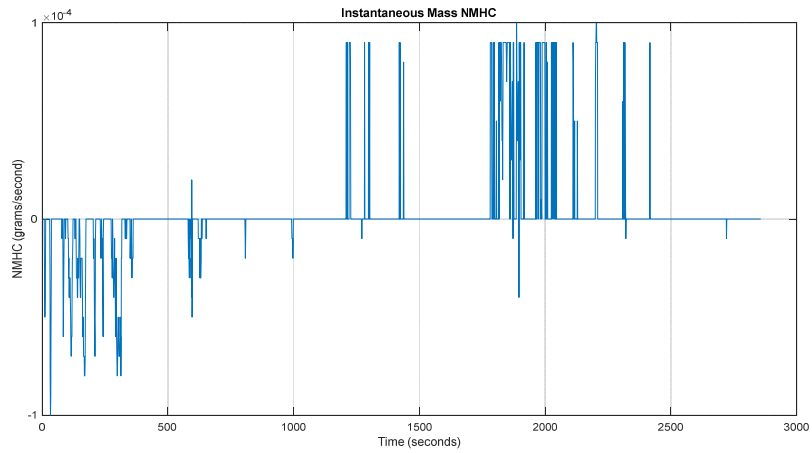


Figure 10.2.7: Vehicle 10 – 80 MPH Steady State Cruise Instantaneous Mass NMHC

iii. Transient Cycle PEMS Test

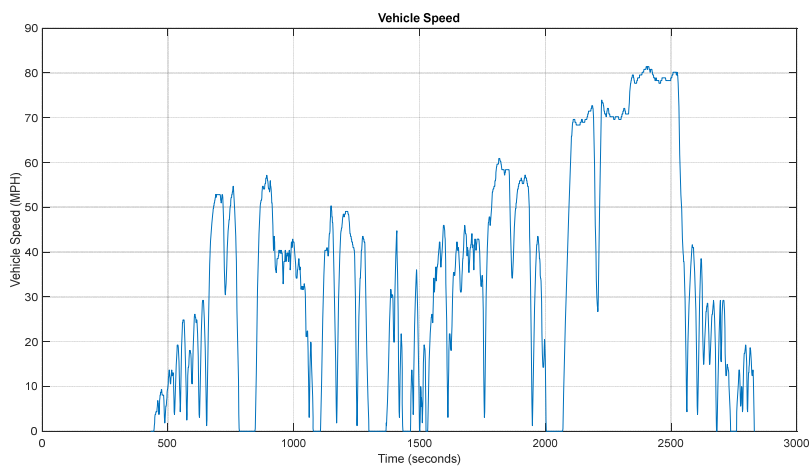


Figure 10.3.1: Vehicle 10 – Transient Cycle Vehicle Speed

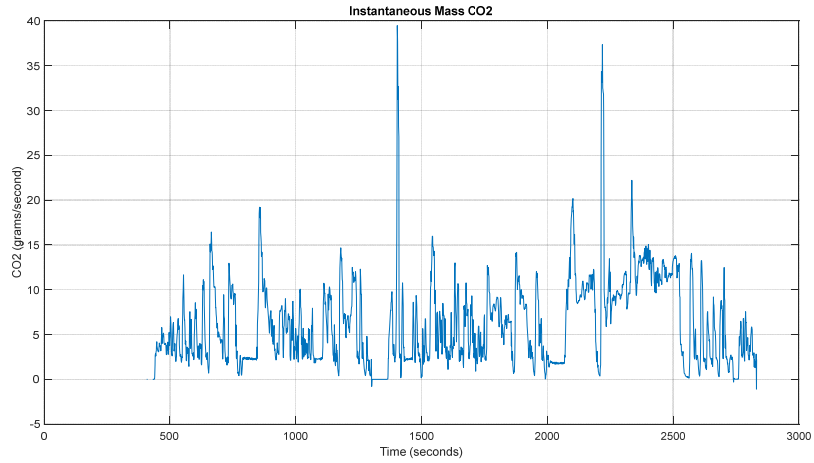


Figure 10.3.2: Vehicle 10 – Transient Cycle Instantaneous Mass CO2

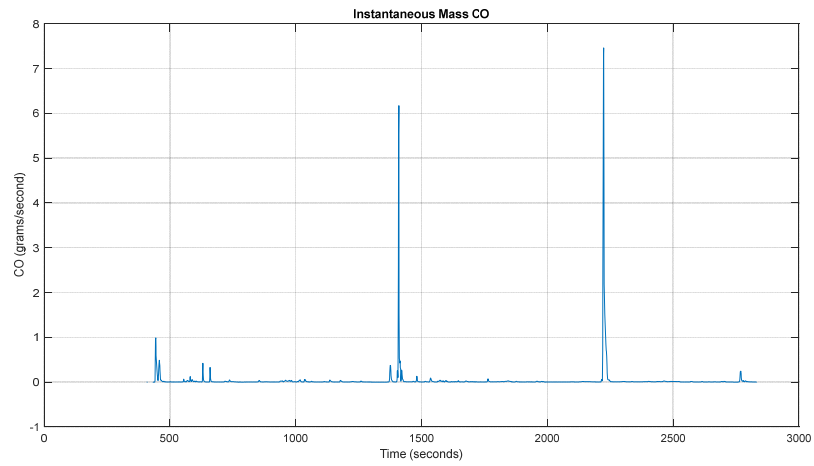


Figure 10.3.3: Vehicle 10 – Transient Cycle Instantaneous Mass CO

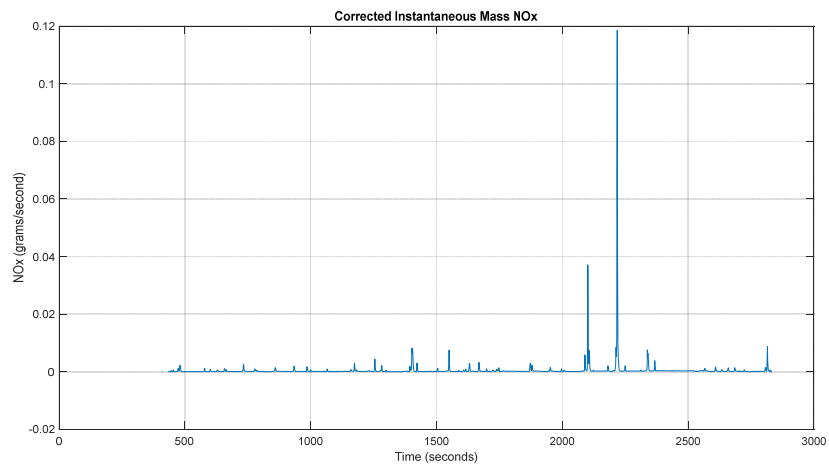


Figure 10.3.4: Vehicle 10 – Transient Cycle Corrected Instantaneous Mass NOx

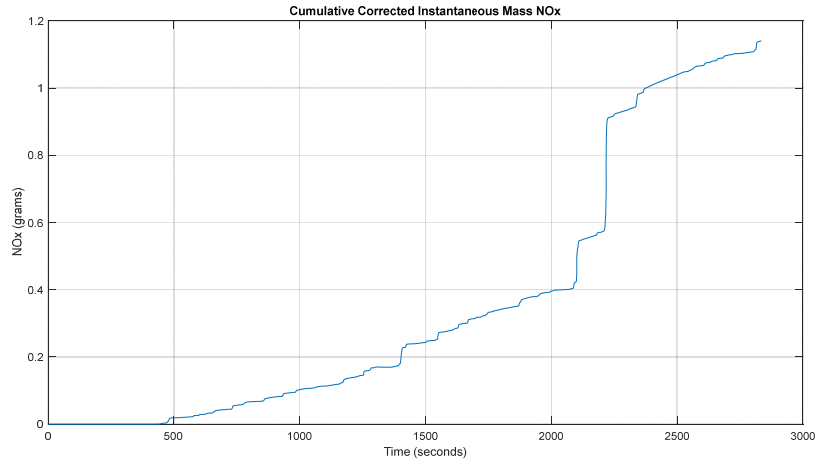


Figure 10.3.5: Vehicle 10 – Transient Cycle Cumulative Corrected Instantaneous Mass NOx

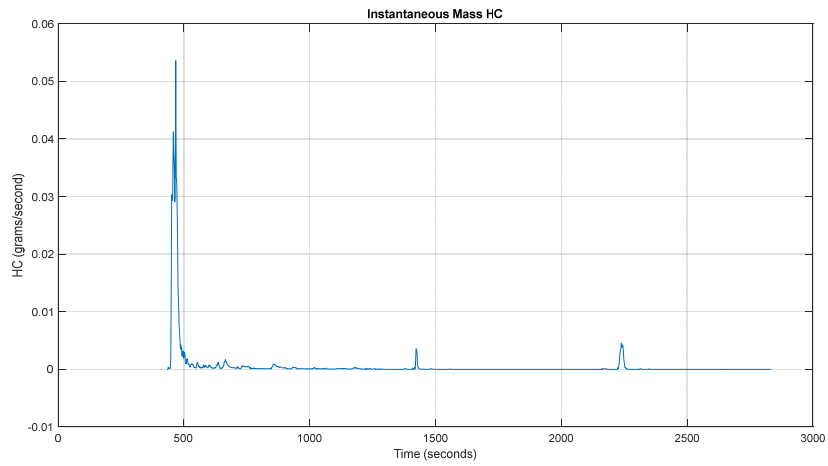


Figure 10.3.6: Vehicle 10 – Transient Cycle Instantaneous Mass HC

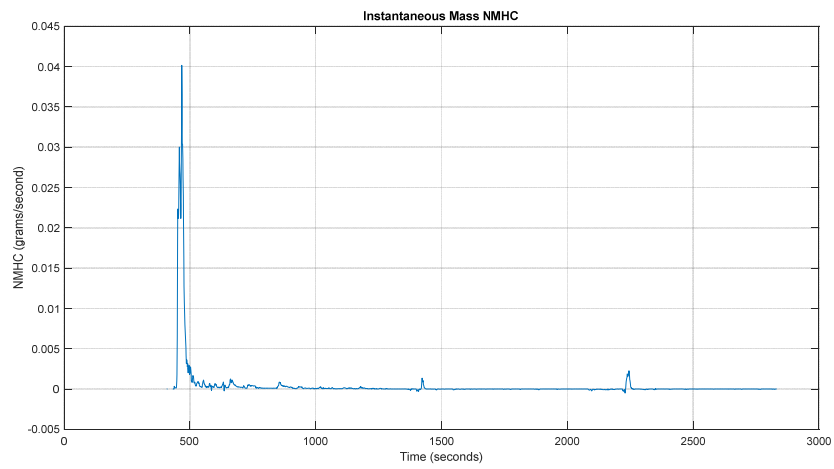


Figure 10.3.7: Vehicle 10 – Transient Cycle Instantaneous Mass NMHC