Prepared for

2ASDU -RNTBCI

OBD CALIBRATION REPORT

BR10 MT

Monday, 28th Sep 2019

Gasoline Powertrains

OBD calibration: BR 10 MT

Content

- Emission summary for OBD test
- OBD validation report
  - Catalyst Diagnosis
  - Misfire Diagnosis
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  - Fuel system Diagnosis
- Summary

OBD calibration: BR 10 MT

EMISSION SUMMARY

	Calibration Threshold	NOx (g/km)	CO (g/km)	NMHC (g/km)
BS 6 **Emission** Limits		0.06	1	0.068
BS 6 **OBD** Limits		0.15	1.9	0.17
catalyst Diagnosis (Results with DF)	13 mmol	0.03	0.27	0.07
Misfire Diagnosis (Results with DF)	3.85 %	0.03	0.30	0.09
Upstream lambda diagnosis (Results with DF)	400ms	0.09	0.23	0.07
Fuel system (Results with DF)	+25%	0.01	1.47	0.08
Base Emission (Results without DF)	NA	0.010	0.158	0.039

OBD calibration: BR 10 MT
Catalyst Diagnosis 1180c OBD Catalyst – Test Details

Vehicle Data			
Vehicle Model	Renault_Kwid_BR10_MT_K2647570_20062019		
Project	BR10_Calibration_for_tuning_for_BS6		
Test Order Name	Renault_Kwid_BR10_MT_K2647570_20062019		
Inertia [kg]	910	VIN[Sample ID]	MEEBBA008K2647570
Vehicle A [N]	5.7	Vehicle Inward Date	19-Jun-2019
Vehicle B [N/(km/h)]	0	Project ID	P08-14427_10
Vehicle C [N/(km/h)^2]	0.0385	Transmission type	Manual
Number of gears	5	Drive Type	Front Wheel Drive

Test Data	
Test Cell	VTC_01
Duration [s]	1180
Number of Phases	2
Cycle Used	MIDC_gbx
Distance [km]	10.71
Odo Before Test [km]	4120
Test Driver	Manish S
Test Engineer	Ayan Dutta

Fuel Parameters

Fuel name:	EH 059	Fuel density [kg/l]:	0.755

Measurement Devices Used

Dilute Analyzer (HORIBA 7200H)	Yes	CVS (HORIBA 7400T)	Yes
Particulate (HORIBA DLS 7100)	Yes	Raw line 1 (MEXA ONE)	No
Opacimeter (AVL439)	No	Raw line 2 (MEXA ONE)	No
Automation (FEV MORPHEE)	Yes	Chassis Dynamometer (HORIBA VULCAN 2WD)	Yes
Micro Soot Sensor (MSS)	No	Particle Counter (AVL PC)	Yes

Continuous Calibration Performed:	No	Continuous Check Performed:	Yes
Bag Calibration Performed:	No	Bag Check Performed:	No

Environmental Conditions

Temperature [°C] :	Value	Min	21.18	Max	23.1
	Limit	Min	20	Max	30

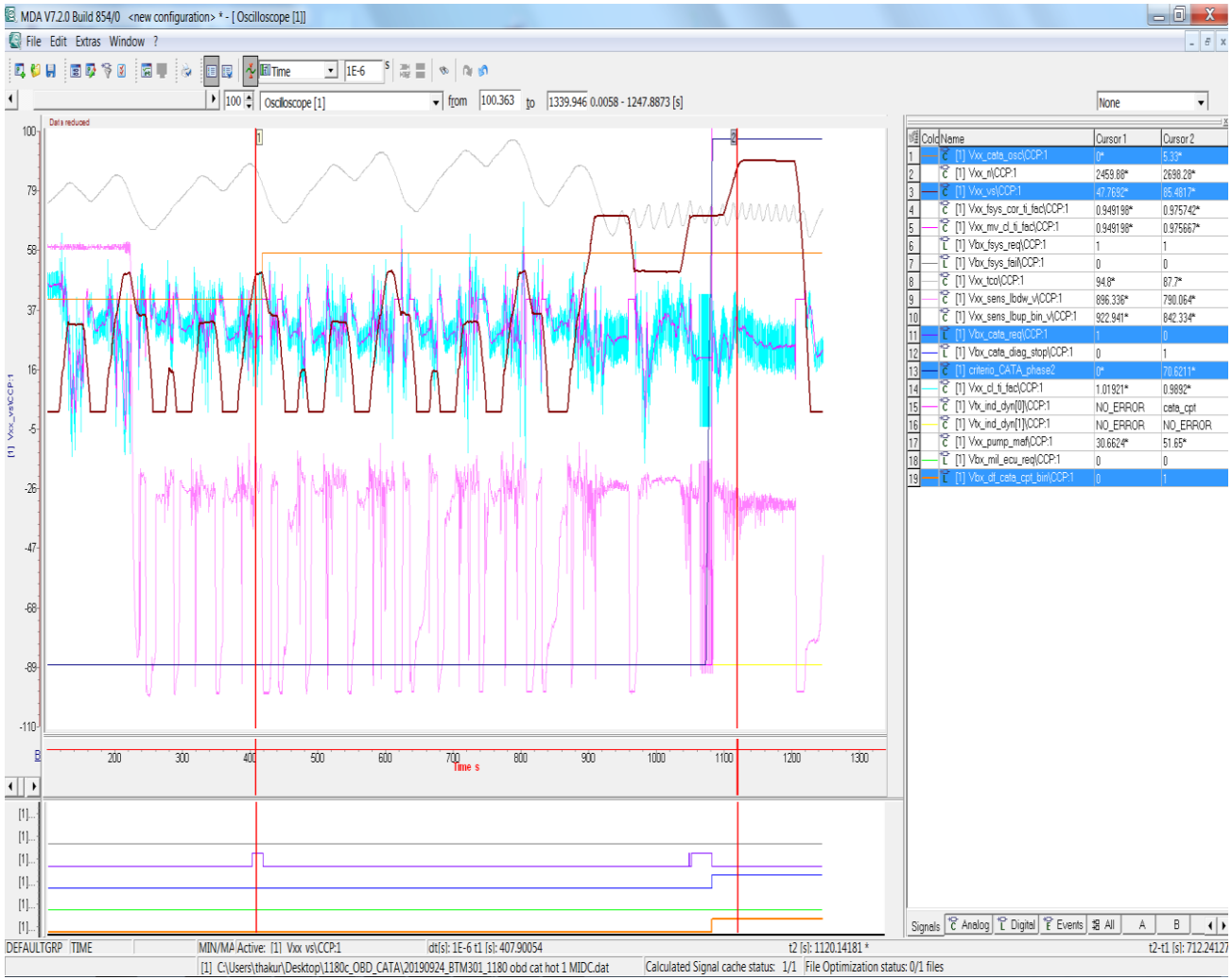
Absolute Humidity [g of H2O / kg of Air] :	Value	Min	10.3	Max	11.6
	Limits	Min	5.5	Max	12.2
Relative Humidity [%]:	60.58	Ambient Temperature [°C]:	21.91	Cell Pressure [mbar]:	929.61

Cycle Run

Phase Number	Phase Name	Distance [km]	Duration [s]	Time Out of Tolerance [s]
1	Urban	4.09	780	1
2	Extra-Urban	6.63	400	0

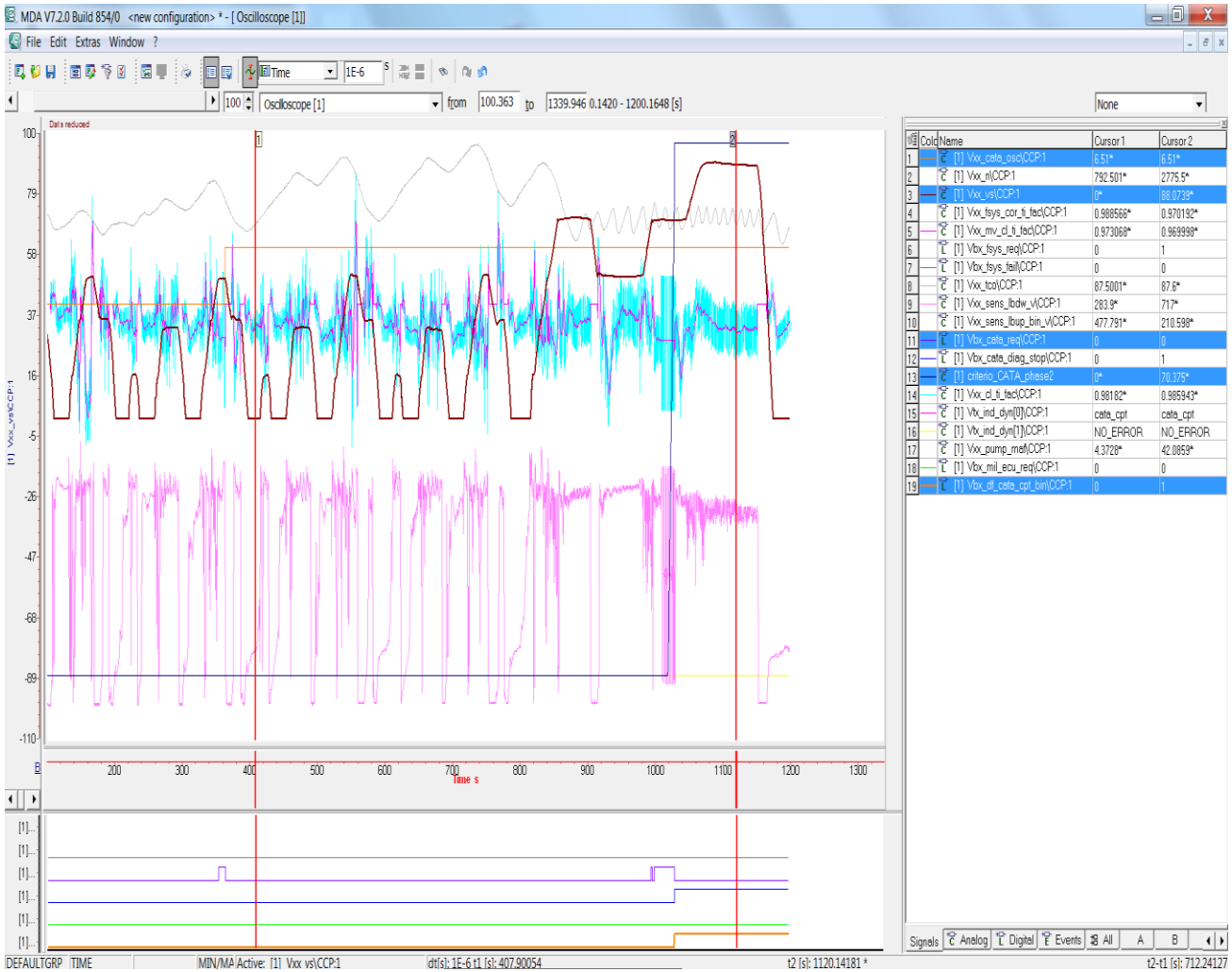
- Test Conducted on MIDC
- OBD Catalyst used
- Test results within Emission OBD limits

OBD calibration: BR 10 MT
Catalyst Diagnosis – 1st MIDC - Precon



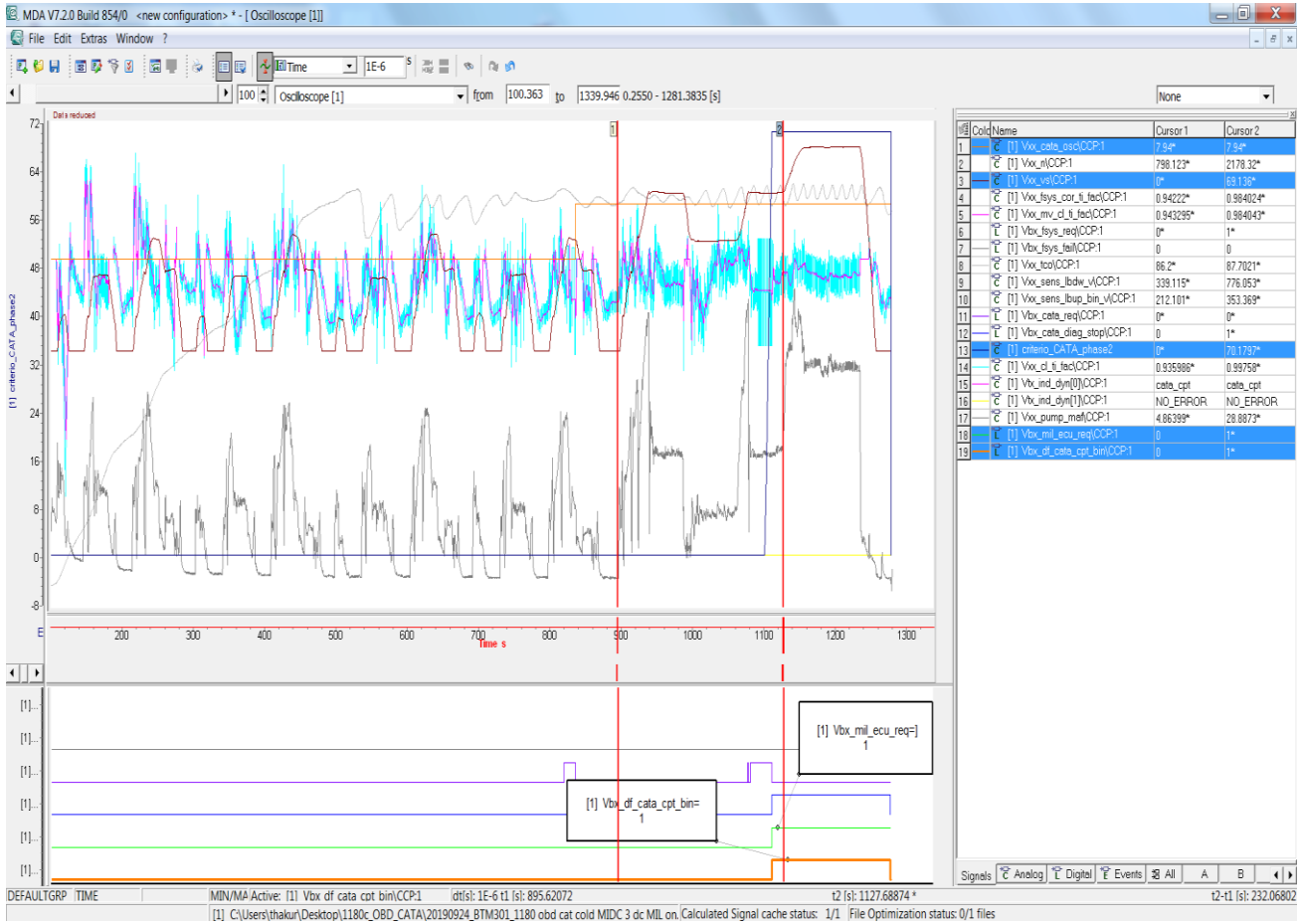
- Error logged with OBD catalyst in precon 1
- OSC calculated as 5.33 mmol in phase1
- OSC confirmed in phase 2 diagnosis & error logged
- Defect bit set as 1

OBD calibration: BR 10 MT
Catalyst Diagnosis – 2nd MIDC - Precon



- Error not erased during 2nd precon to verify the MIL ON during 3rd cycle
- OSC calculated as 6.51 mmol in phase 1
- OSC confirmed in phase 2 diagnosis
- Defect bit set as 1

OBD calibration: BR 10 MT
Catalyst Diagnosis – 3rd MIDC - Emission with MIL ON



- Error not erased during 3rd emission cycle to verify the MIL ON
- OSC calculated as 7.96 mmol in phase 1
- OSC confirmed in phase 2 diagnosis
- Defect bit set as 1
- MIL ON verified
- Emission within OBD limit

OBD calibration: BR 10 MT
Misfire Diagnosis – Test Details

Vehicle Data			
Vehicle Model	Renault_Kwid_BR10_MT_K1637018_03042019		
Project	OBD_Trials		
Test Order Name	Renault_Kwid_BR10_MT_K1637018_03042019		
Inertia [kg]	910	VIN[Sample ID]	MEEBBA005K1637018
Vehicle A [N]	5.7	Vehicle Inward Date	4-Apr-2019
Vehicle B [N/(km/h)]	0	Project ID	P08-14427-10
Vehicle C [N/(km/h)^2]	0.0385	Transmission type	Manual
Number of gears	6	Drive Type	Front Wheel Drive

Test Data	
Test Cell	VTC_01
Duration [s]	1180
Number of Phases	2
Cycle Used	MIDC_gbx
Distance [km]	10.63
Odo Before Test [km]	5973
Test Driver	Suresh B
Test Engineer	Bhushan B

Fuel Parameters

Fuel name:	EH 059	Fuel density [kg/l]:	0.755

Measurement Devices Used

Dilute Analyzer (HORIBA 7200H)	Yes	CVS (HORIBA 7400T)	Yes
Particulate (HORIBA DLS 7100)	Yes	Raw line 1 (MEXA ONE)	No
Opacimeter (AVL439)	No	Raw line 2 (MEXA ONE)	No
Automation (FEV MORPHEE)	Yes	Chassis Dynamometer (HORIBA VULCAN 2WD)	Yes
Micro Soot Sensor (MSS)	No	Particle Counter (AVL PC)	Yes

Continuous Calibration Performed:	No	Continuous Check Performed:	Yes
Bag Calibration Performed:	No	Bag Check Performed:	No

Environmental Conditions

Temperature [°C] :	Value	Min	21.16	Max	22.8
	Limit	Min	20	Max	30

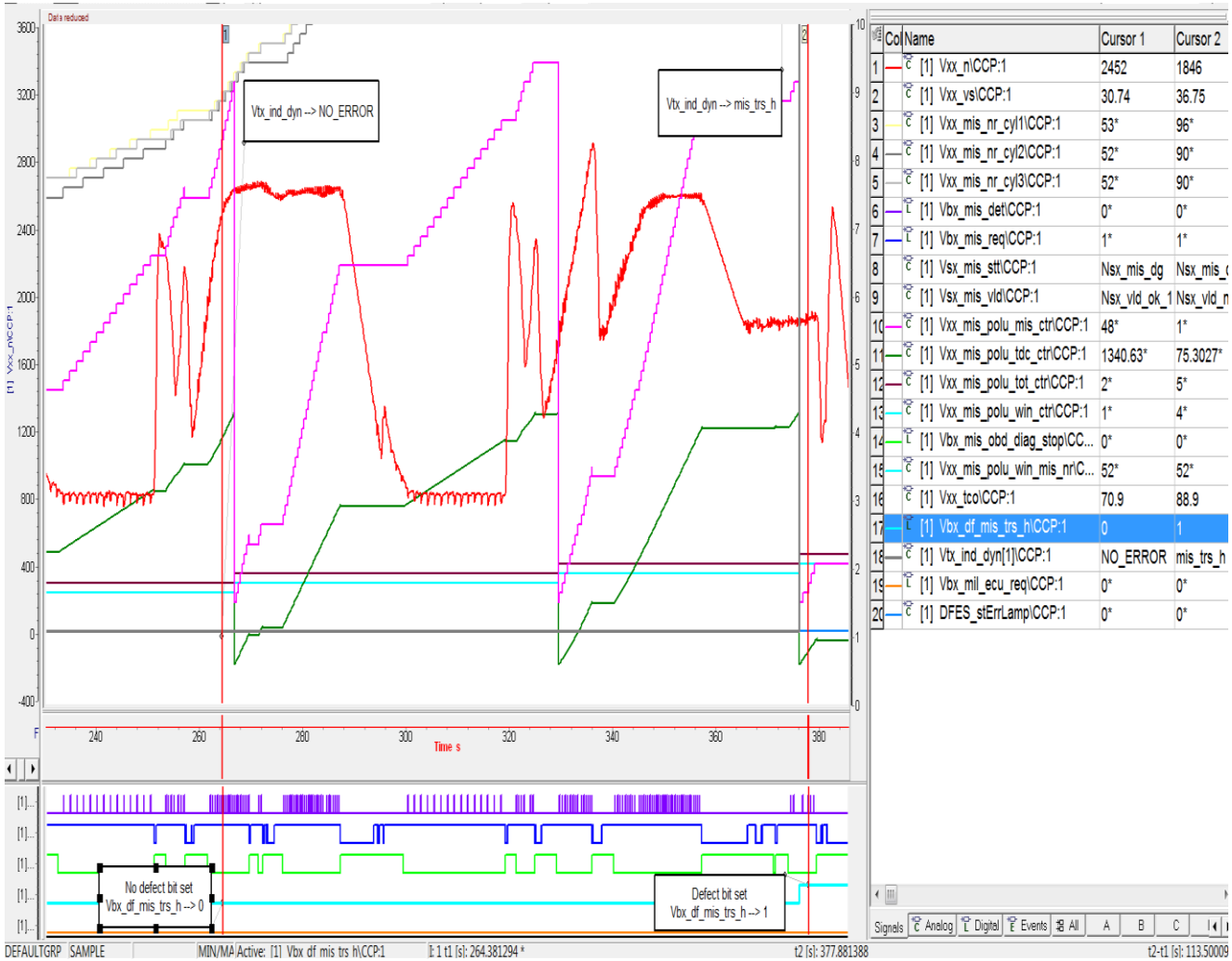
Absolute Humidity [g of H2O / kg of Air] :	Value	Min	10.6	Max	11.8
	Limits	Min	5.5	Max	12.2
Relative Humidity [%]:	62.34	Ambient Temperature [°C]:	21.68	Cell Pressure [mbar]:	928.30

Cycle Run

Phase Number	Phase Name	Distance [km]	Duration [s]	Time Out of Tolerance [s]
1	Urban	4.04	780	0
2	Extra-Urban	6.59	400	0

- Test Conducted on MIDC
- 3 K Catalyst used
- Test results within Emission OBD limits

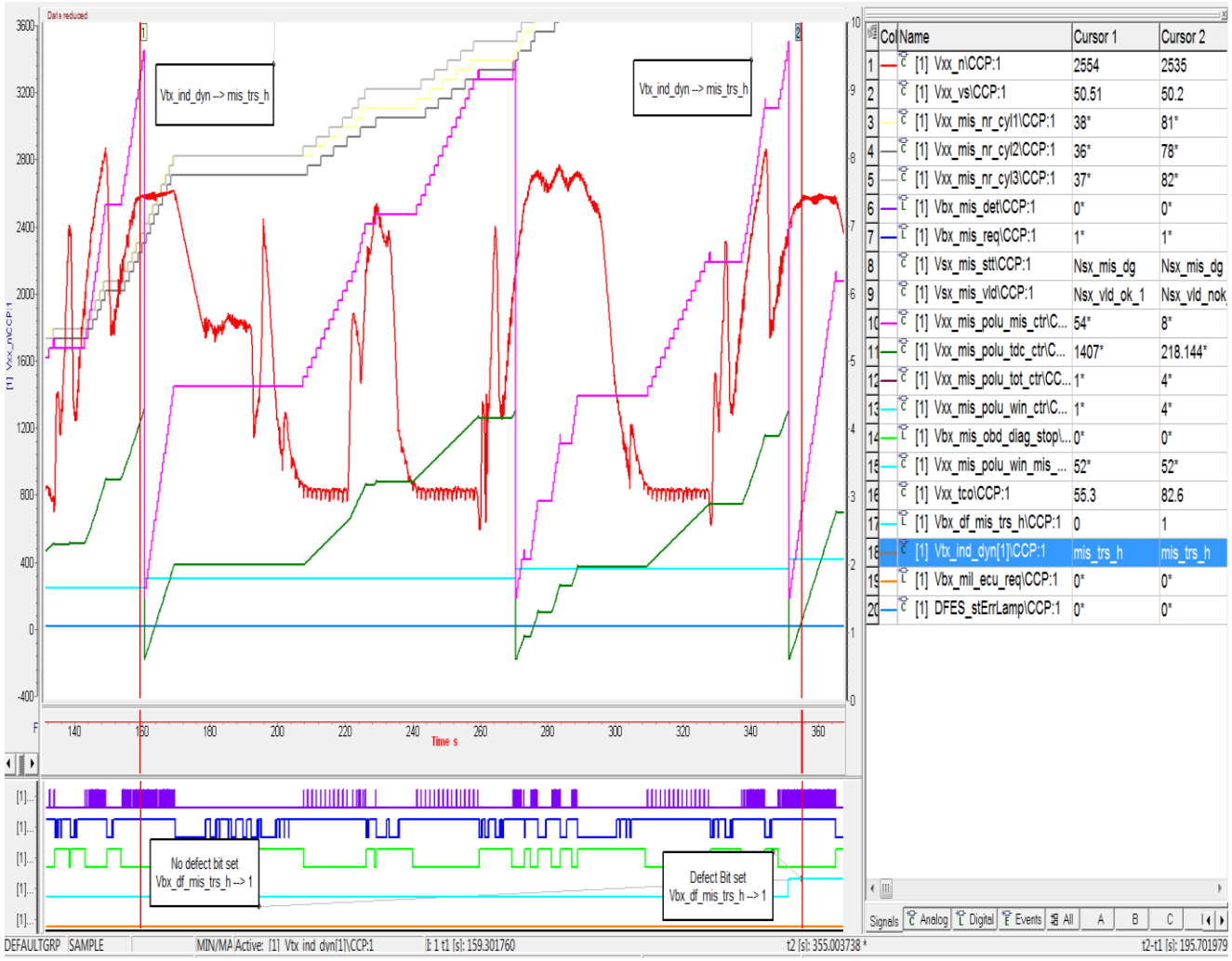
OBD calibration: BR 10 MT
Misfire Diagnosis – 1st MIDC - Precon



Col	Name	Cursor 1	Cursor 2
1	[1] Vxx_n\CCP:1	2452	1846
2	[1] Vxx_vs\CCP:1	30.74	36.75
3	[1] Vxx_mis_nr_cyl1\CCP:1	53*	96*
4	[1] Vxx_mis_nr_cyl2\CCP:1	52*	90*
5	[1] Vxx_mis_nr_cyl3\CCP:1	52*	90*
6	[1] Vbx_mis_det\CCP:1	0*	0*
7	[1] Vbx_mis_req\CCP:1	1*	1*
8	[1] Vsx_mis_stt\CCP:1	Nsx_mis_dg	Nsx_mis_(
9	[1] Vsx_mis_vld\CCP:1	Nsx_vld_ok_1	Nsx_vld_n
10	[1] Vxx_mis_polu_mis_ctr\CCP:1	48*	1*
11	[1] Vxx_mis_polu_tdc_ctr\CCP:1	1340.63*	75.3027*
12	[1] Vxx_mis_polu_tot_ctr\CCP:1	2*	5*
13	[1] Vxx_mis_polu_win_ctr\CCP:1	1*	4*
14	[1] Vbx_mis_obd_diag_stop\CC...	0*	0*
15	[1] Vxx_mis_polu_win_mis_nr\C...	52*	52*
16	[1] Vxx_tco\CCP:1	70.9	88.9
17	[1] Vbx_df_mis_trs_h\CCP:1	0	1
18	[1] Vtx_ind_dyn[1]\CCP:1	NO_ERROR	mis_trs_h
19	[1] Vbx_mil_ecu_req\CCP:1	0*	0*
20	[1] DFES_stErrLamp\CCP:1	0*	0*

- Misfire percentage applied as 3.85 (Misfire rate N 26)
- After successful completion of 4 counters error is logged
- Defect bit set as 1
- Fault detection in Phase 1

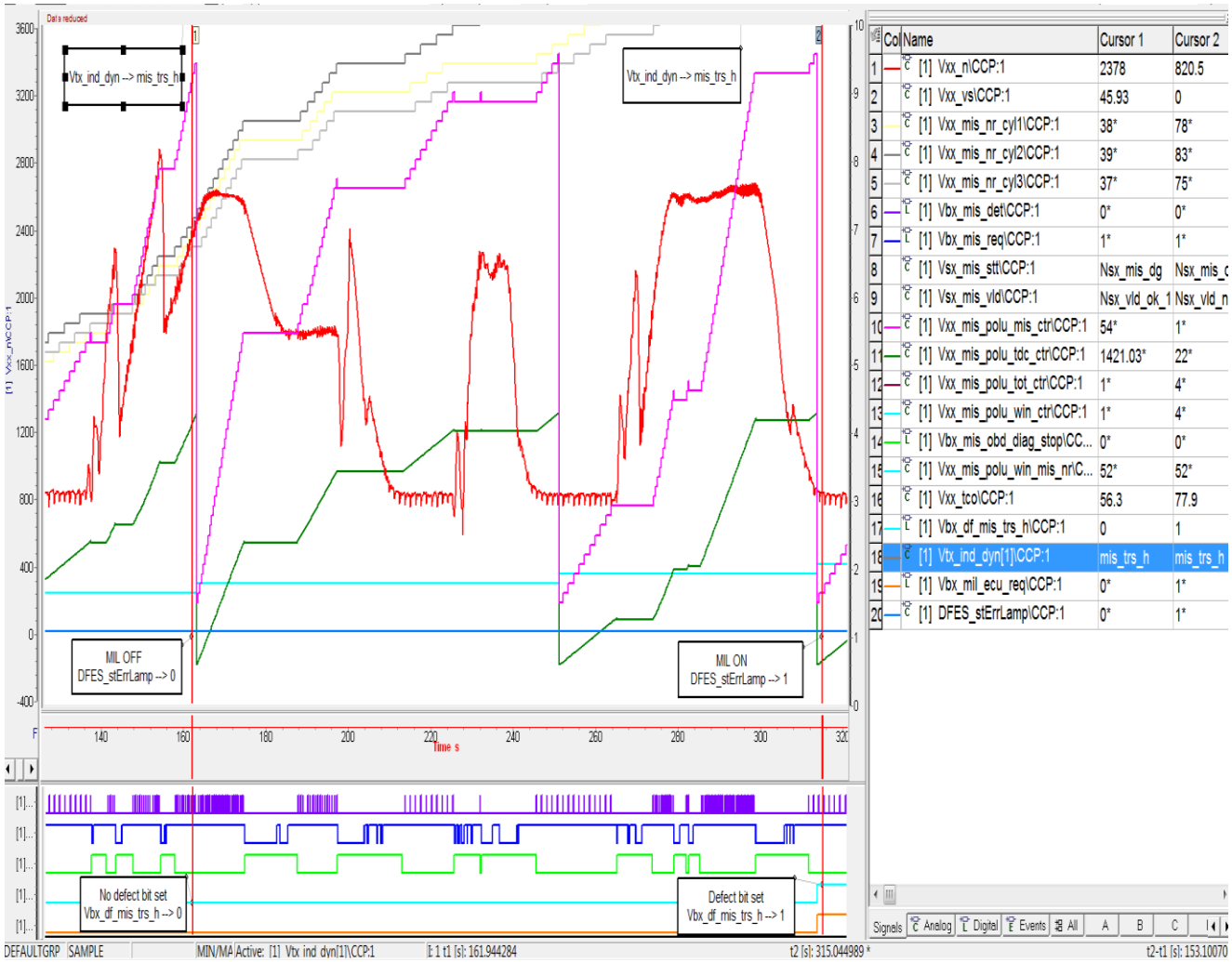
OBD calibration: BR 10 MT
Misfire Diagnosis – 2nd MIDC - Precon



Col	Name	Cursor 1	Cursor 2
1	[1] Vxx_n\CCP:1	2554	2535
2	[1] Vxx_vs\CCP:1	50.51	50.2
3	[1] Vxx_mis_nr_cyl1\CCP:1	38*	81*
4	[1] Vxx_mis_nr_cyl2\CCP:1	36*	78*
5	[1] Vxx_mis_nr_cyl3\CCP:1	37*	82*
6	[1] Vbx_mis_det\CCP:1	0*	0*
7	[1] Vbx_mis_req\CCP:1	1*	1*
8	[1] Vsx_mis_stt\CCP:1	Nsx_mis_dg	Nsx_mis_dg
9	[1] Vsx_mis_vld\CCP:1	Nsx_vld_ok_1	Nsx_vld_nok
10	[1] Vxx_mis_polu_mis_ctr\C...	54*	8*
11	[1] Vxx_mis_polu_tdc_ctr\C...	1407*	218.144*
12	[1] Vxx_mis_polu_tot_ctr\CC...	1*	4*
13	[1] Vxx_mis_polu_win_ctr\C...	1*	4*
14	[1] Vbx_mis_obd_diag_stop\...	0*	0*
15	[1] Vxx_mis_polu_win_mis_...	52*	52*
16	[1] Vxx_tco\CCP:1	55.3	82.6
17	[1] Vbx_df_mis_trs_h\CCP:1	0	1
18	[1] Vbx_ind_dyn[1]\CCP:1	mis_trs_h	mis_trs_h
19	[1] Vbx_mil_ecu_req\CCP:1	0*	0*
20	[1] DFES_stErrLamp\CCP:1	0*	0*

- Misfire percentage applied as 3.85 (Misfire rate N 26)
- After successful completion of 4 counters defect bit set as 1
- Error not erased during 2nd precon to verify the MIL ON during 3rd cycle
- Defect bit set as 1
- Fault detection in Phase 1

OBD calibration: BR 10 MT
Misfire Diagnosis – 3rd MIDC - Emission with MIL ON



Col	Name	Cursor 1	Cursor 2
1	[1] Vxx_n\CCP:1	2378	820.5
2	[1] Vxx_vs\CCP:1	45.93	0
3	[1] Vxx_mis_nr_cyl1\CCP:1	38*	78*
4	[1] Vxx_mis_nr_cyl2\CCP:1	39*	83*
5	[1] Vxx_mis_nr_cyl3\CCP:1	37*	75*
6	[1] Vbx_mis_det\CCP:1	0*	0*
7	[1] Vbx_mis_req\CCP:1	1*	1*
8	[1] Vsx_mis_stt\CCP:1	Nsx_mis_dg	Nsx_mis_c
9	[1] Vsx_mis_vld\CCP:1	Nsx_vld_ok_1	Nsx_vld_n
10	[1] Vxx_mis_polu_mis_ctr\CCP:1	54*	1*
11	[1] Vxx_mis_polu_tdc_ctr\CCP:1	1421.03*	22*
12	[1] Vxx_mis_polu_tot_ctr\CCP:1	1*	4*
13	[1] Vxx_mis_polu_win_ctr\CCP:1	1*	4*
14	[1] Vbx_mis_obd_diag_stop\CC...	0*	0*
15	[1] Vxx_mis_polu_win_mis_nr\C...	52*	52*
16	[1] Vxx_tco\CCP:1	56.3	77.9
17	[1] Vbx_df_mis_trs_h\CCP:1	0	1
18	[1] Vtx_ind_dyn[1]\CCP:1	mis_trs_h	mis_trs_h
19	[1] Vbx_mil_ecu_req\CCP:1	0*	1*
20	[1] DFES_stErrLamp\CCP:1	0*	1*

- Error not erased during 3rd emission cycle to verify the MIL ON
- Misfire percentage applied as 3.85 (Misfire rate N 26)
- After successful completion of 4 counters defect bit set as 1
- Fault detection in Phase 1
- MIL ON Verified
- Emission within OBD limit

OBD calibration: BR 10 MT
Lambda Upstream Diagnosis – Test Details

Vehicle Data			
Vehicle Model	Renault_Kwid_BR10_MT_K1637018_03042019		
Project	OBD_Trials		
Test Order Name	Renault_Kwid_BR10_MT_K1637018_03042019		
Inertia [kg]	910	VIN[Sample ID]	MEEBBA005K1637018
Vehicle A [N]	5.7	Vehicle Inward Date	4-Apr-2019
Vehicle B [N/(km/h)]	0	Project ID	P08-14427_10
Vehicle C [N/(km/h)^2]	0.0385	Transmission type	Manual
Number of gears	6	Drive Type	Front Wheel Drive

Test Data	
Test Cell	VTC_01
Duration [s]	1180
Number of Phases	2
Cycle Used	MIDC_gbx
Distance [km]	10.61
Odo Before Test [km]	5913
Test Driver	Manish Sharma
Test Engineer	Rahul Koturkar

Fuel Parameters

Fuel name:	EH 059	Fuel density [kg/l]:	0.755

Measurement Devices Used

Dilute Analyzer (HORIBA 7200H)	Yes	CVS (HORIBA 7400T)	Yes
Particulate (HORIBA DLS 7100)	Yes	Raw line 1 (MEXA ONE)	No
Opacimeter (AVL439)	No	Raw line 2 (MEXA ONE)	No
Automation (FEV MORPHEE)	Yes	Chassis Dynamometer (HORIBA VULCAN 2WD)	Yes
Micro Soot Sensor (MSS)	No	Particle Counter (AVL PC)	Yes

Continuous Calibration Performed:	No	Continuous Check Performed:	No
Bag Calibration Performed:	No	Bag Check Performed:	No

Environmental Conditions

Temperature [°C] :	Value	Min	20.99	Max	23.0
	Limit	Min	20	Max	30

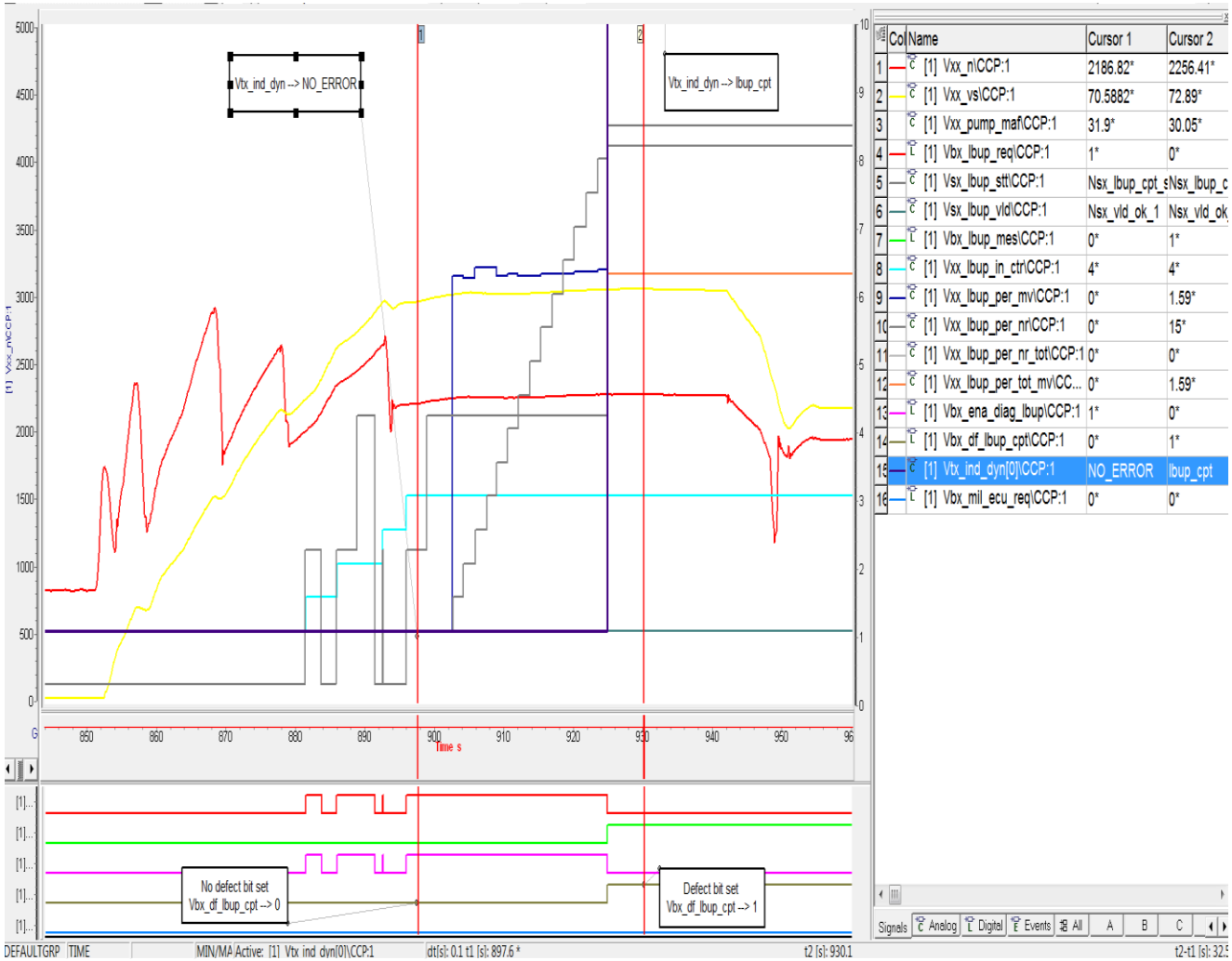
Absolute Humidity [g of H2O / kg of Air] :	Value	Min	10.3	Max	12.0
	Limits	Min	5.5	Max	12.2
Relative Humidity [%]:	60.89	Ambient Temperature [°C]:	21.83	Cell Pressure [mbar]:	924.92

Cycle Run

Phase Number	Phase Name	Distance [km]	Duration [s]	Time Out of Tolerance [s]
1	Urban	4.03	780	1
2	Extra-Urban	6.58	400	0

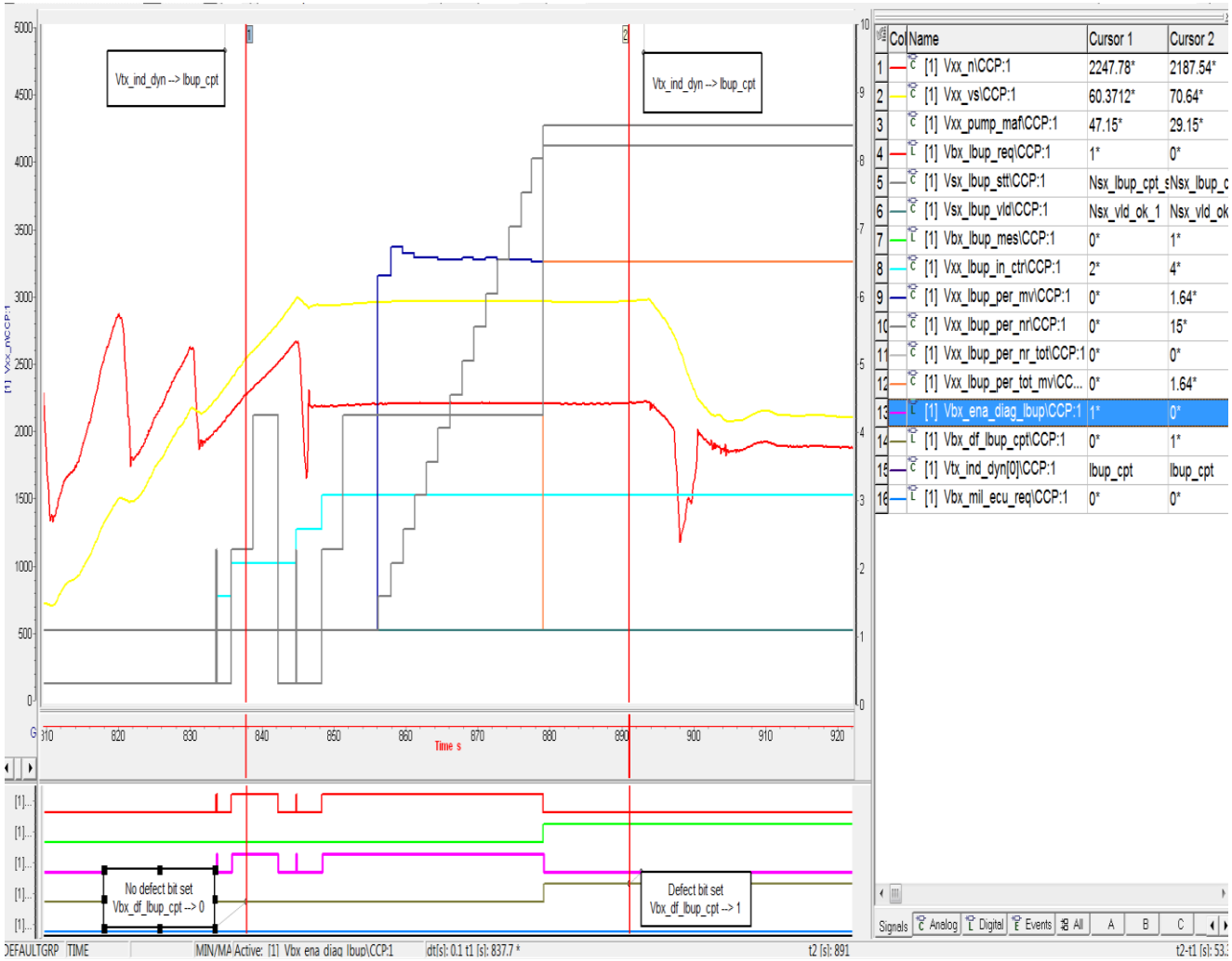
- Test Conducted on MIDC
- 3 K Catalyst used
- Test results within Emission OBD limits

OBD calibration: BR 10 MT
Lambda Upstream Diagnosis – 1st MIDC - Precon



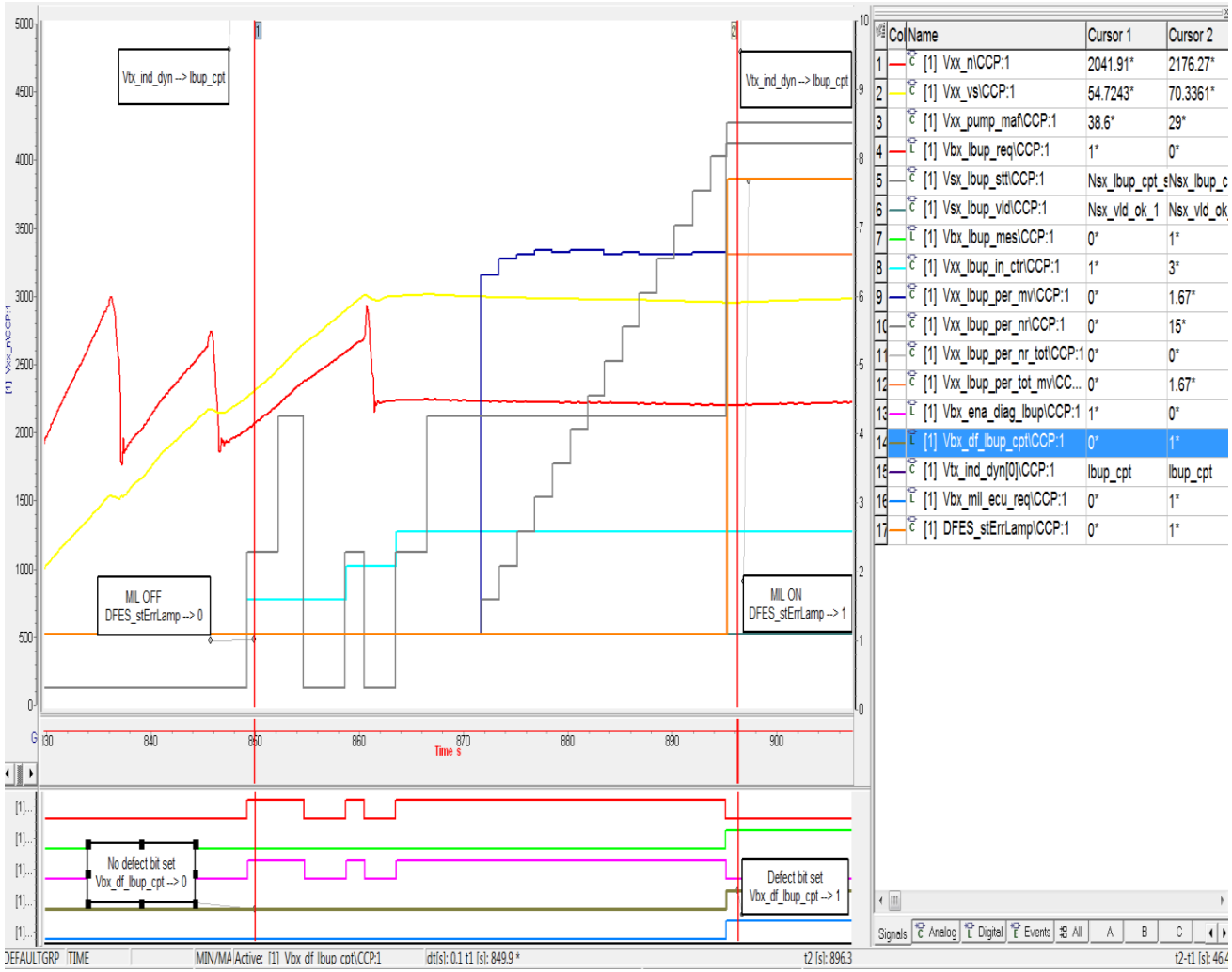
- Rich Lean transition delay applied as 400 ms
- Fault detection in Phase 2
- Error logged after completion of 15 windows counter
- Defect bit set as 1
- Fault detection in phase 2

OBD calibration: BR 10 MT
Lambda Upstream Diagnosis – 2nd MIDC - Precon



- Rich Lean transition delay applied as 400ms
- Fault detection in Phase 2
- Error not erased during 2nd precon to verify the MIL ON during 3rd cycle
- Defect bit set as 1
- Fault detection in phase 2

OBD calibration: BR 10 MT
Lambda Upstream Diagnosis – 3rd MIDC – Emission with MIL ON



Col	Name	Cursor 1	Cursor 2
1	[1] Vxx_n\CCP:1	2041.91*	2176.27*
2	[1] Vxx_vs\CCP:1	54.7243*	70.3361*
3	[1] Vxx_pump_maf\CCP:1	38.6*	29*
4	[1] Vbx_lbup_req\CCP:1	1*	0*
5	[1] Vsx_lbup_stt\CCP:1	Nsx_lbup_cpt_s	Nsx_lbup_c
6	[1] Vsx_lbup_vld\CCP:1	Nsx_vld_ok_1	Nsx_vld_ok
7	[1] Vbx_lbup_mes\CCP:1	0*	1*
8	[1] Vxx_lbup_in_ctr\CCP:1	1*	3*
9	[1] Vxx_lbup_per_mv\CCP:1	0*	1.67*
10	[1] Vxx_lbup_per_nr\CCP:1	0*	15*
11	[1] Vxx_lbup_per_nr_tot\CCP:1	0*	0*
12	[1] Vxx_lbup_per_tot_mv\CC...	0*	1.67*
13	[1] Vbx_ena_diag_lbup\CCP:1	1*	0*
14	[1] Vbx_df_lbup_cpt\CCP:1	0*	1*
15	[1] Vtx_ind_dyn[0]\CCP:1	lbup_cpt	lbup_cpt
16	[1] Vbx_mil_ecu_req\CCP:1	0*	1*
17	[1] DFES_stErrLamp\CCP:1	0*	1*

- Rich Lean transition delay applied as 400ms
- Fault detection in Phase 2
- Error not erased during 3rd emission cycle to verify the MIL ON
- Defect bit set as 1
- Fault detection in phase 2
- MIL ON verified
- Emission within OBD limit

OBD calibration: BR 10 MT
Fuel System Diagnosis – Test Details

Vehicle Data			
Vehicle Model	Renault_Kwid_BR10_MT_K2646445_21062019		
Project	BR10_Calibration_for_tuning_for_BS6		
Test Order Name	Renault_Kwid_BR10_MT_K2646445_21062019		
Inertia [kg]	910	VIN[Sample ID]	MEEBBA000K2646445
Vehicle A [N]	5.7	Vehicle Inward Date	20-Jun-2019
Vehicle B [N/(km/h)]	0	Project ID	P08-14427-10
Vehicle C [N/(km/h)^2]	0.0385	Transmission type	Manual
Number of gears	5	Drive Type	Front Wheel Drive

Test Data	
Test Cell	VTC_01
Duration [s]	1180
Number of Phases	2
Cycle Used	MIDC_gbx
Distance [km]	10.68
Odo Before Test [km]	4090
Test Driver	Suresh B
Test Engineer	Rahul Koturkar

Fuel Parameters

Fuel name:	EH 059	Fuel density [kg/l]:	0.755

Measurement Devices Used

Dilute Analyzer (HORIBA 7200H)	Yes	CVS (HORIBA 7400T)	Yes
Particulate (HORIBA DLS 7100)	No	Raw line 1 (MEXA ONE)	No
Opacimeter (AVL439)	No	Raw line 2 (MEXA ONE)	No
Automation (FEV MORPHEE)	Yes	Chassis Dynamometer (HORIBA VULCAN 2WD)	Yes
Micro Soot Sensor (MSS)	No		

Continuous Calibration Performed:	No	Continuous Check Performed:	Yes
Bag Calibration Performed:	No	Bag Check Performed:	No

Environmental Conditions

Temperature [°C] :	Value	Min	22.21	Max	23.34
	Limit	Min	20	Max	30

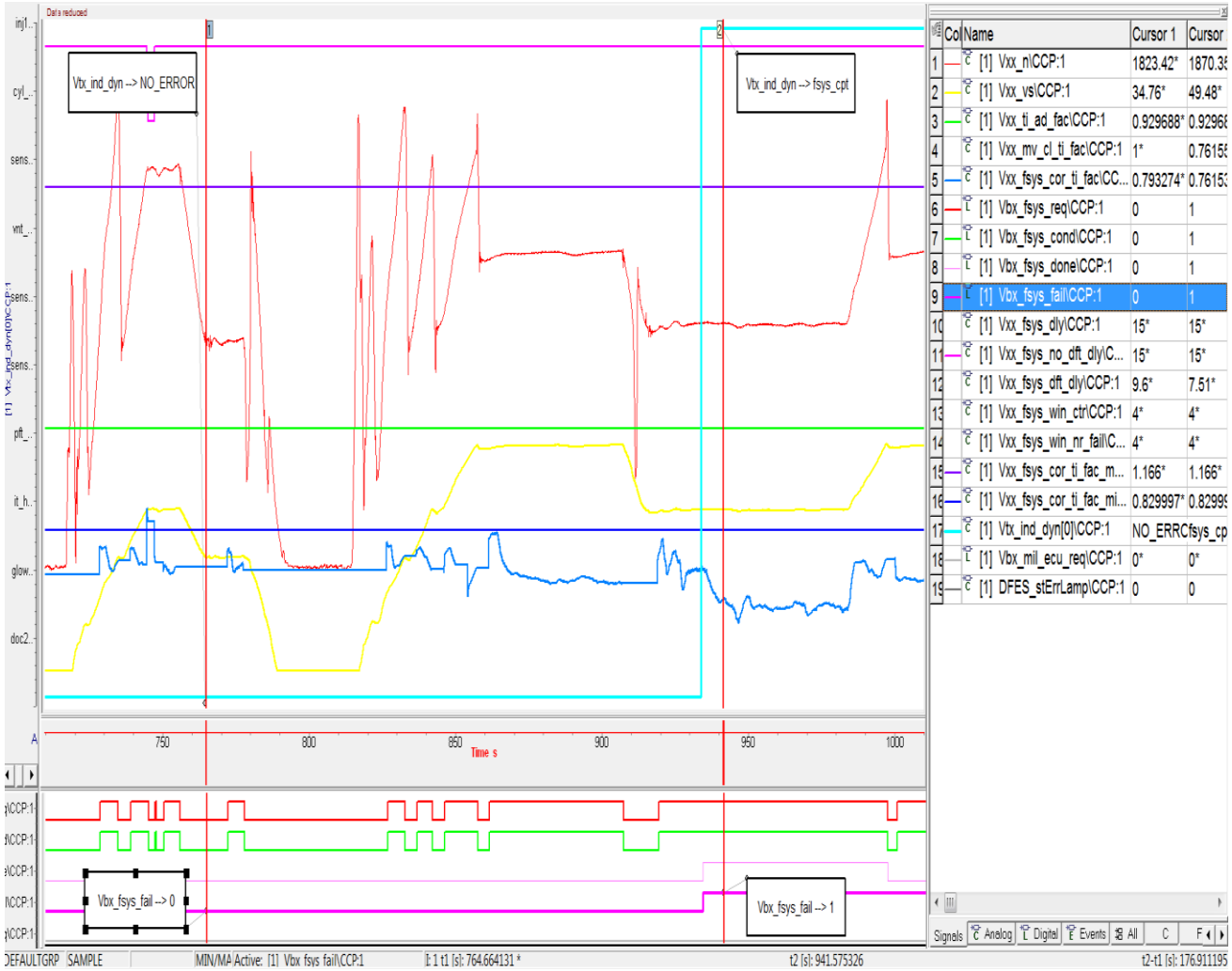
Absolute Humidity [g of H2O / kg of Air] :	Value	Min	10.3	Max	11.2
	Limits	Min	5.5	Max	12.2
Relative Humidity [%]:	56.50	Ambient Temperature [°C]:	22.62	Cell Pressure [mbar]:	931.96

Cycle Run

Phase Number	Phase Name	Distance [km]	Duration [s]	Time Out of Tolerance [s]
1	Urban	4.06	780	1
2	Extra-Urban	6.63	400	0

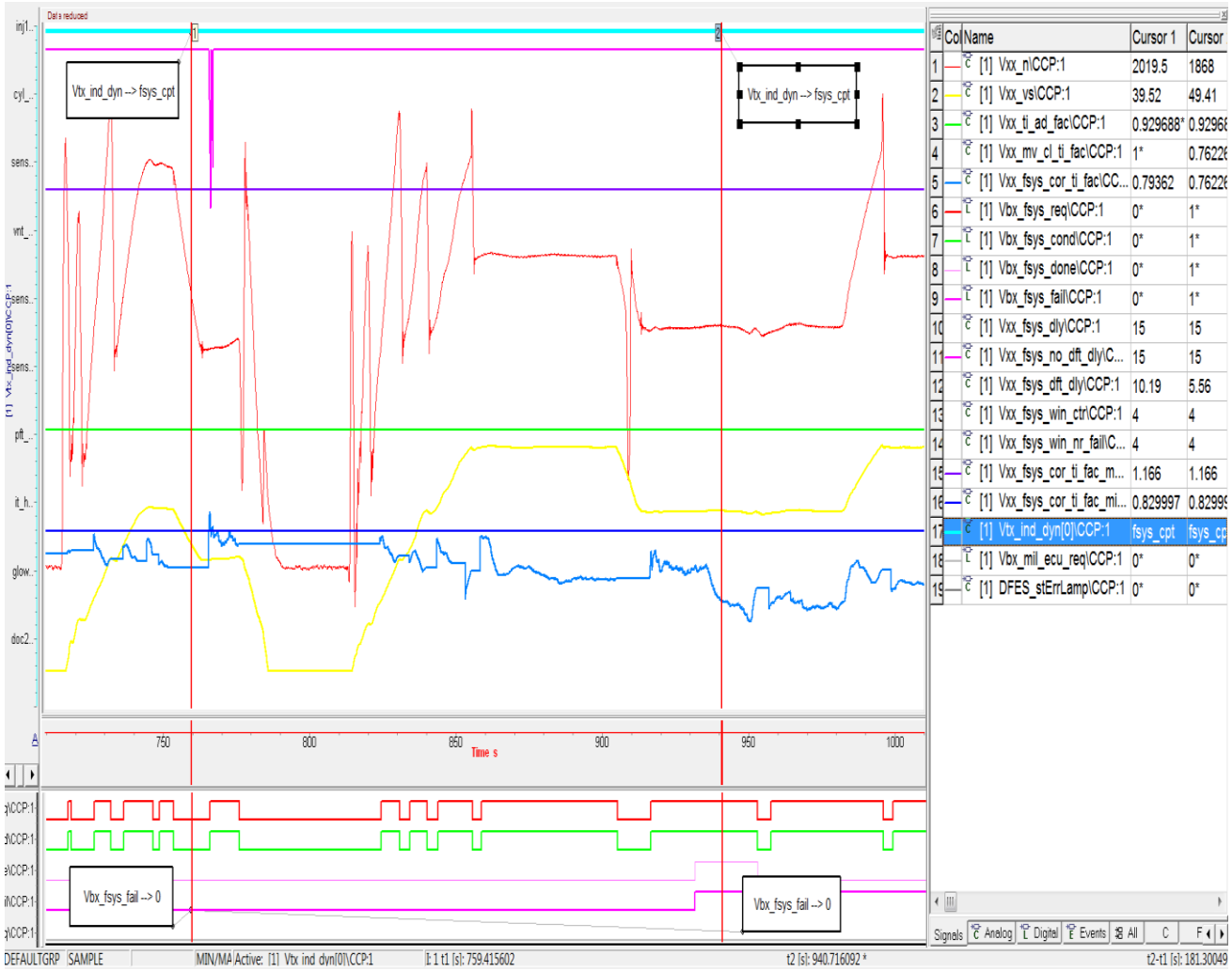
- Test Conducted on MIDC
- 3 K Catalyst used
- Test results within Emission OBD limits

OBD calibration: BR 10 MT
Fuel system Diagnosis – 1st MIDC - Precon



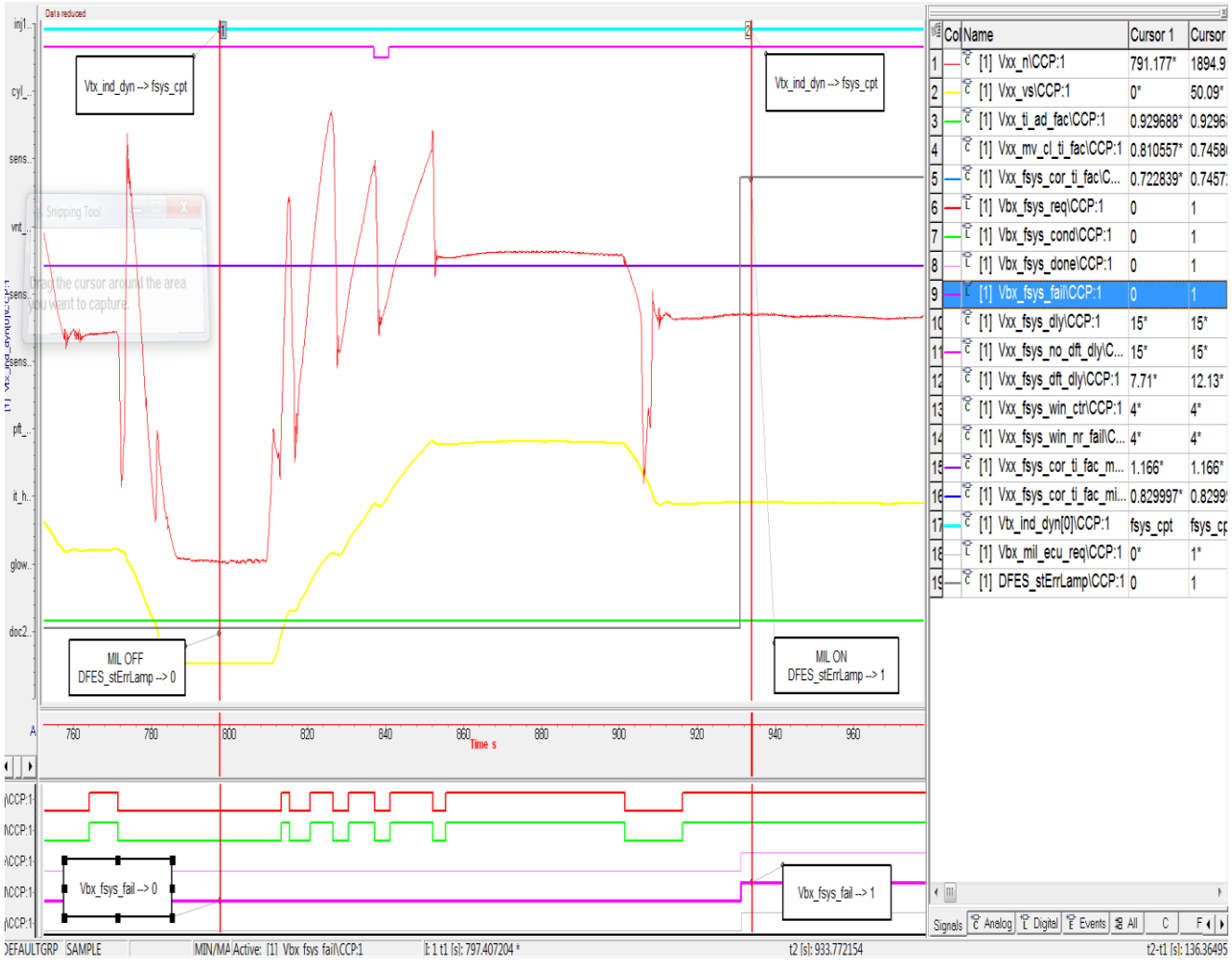
- Richness applied as +25%
- Error logged after completion of consecutive 4 window counter (15 sec each)
- Fault detection in phase 2
- Defect bit set as 1

OBD calibration: BR 10 MT
Fuel system Diagnosis – 2nd MIDC - Precon



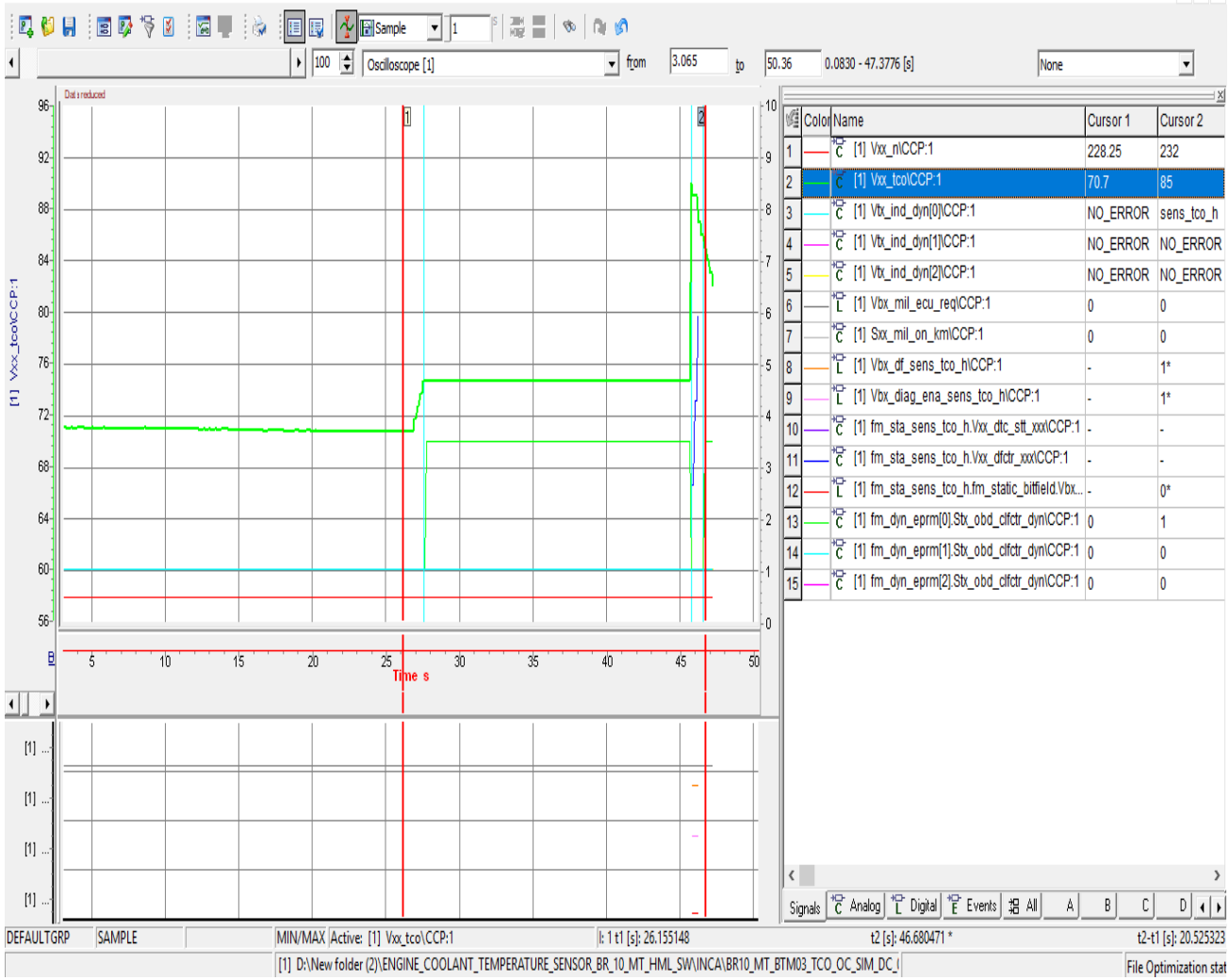
- Richness applied as +25%
- Error logged after completion of consecutive 4 windows counter (15 sec each)
- Error not erased during 2nd precon to verify the MIL ON during 3rd cycle
- Fault detection in phase 2
- Defect bit set as 1

OBD calibration: BR 10 MT
Fuel system Diagnosis – 3rd MIDC - Emission with MIL ON



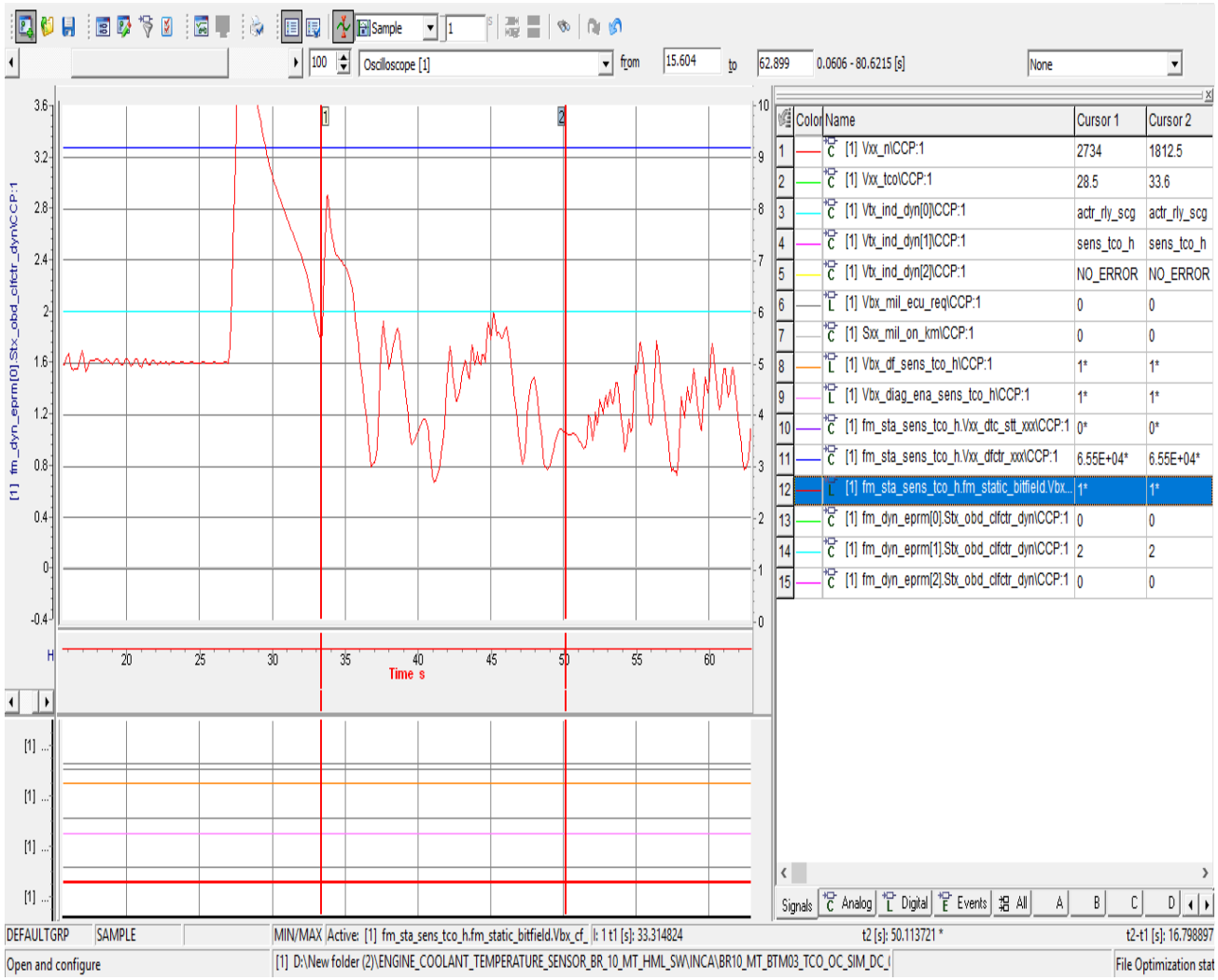
- Richness applied as +25%
- Error logged after completion of consecutive 4 windows counter (15 sec each)
- Error not erased during 3rd emission cycle to verify the MIL ON
- Fault detection in phase 2
- Defect bit set as 1
- MIL ON verified
- Emission within OBD limit

Electrical OBD calibration: BR 10 MT
TCO Open Circuit Diagnosis – 1st Driving cycle – INCA Measurements



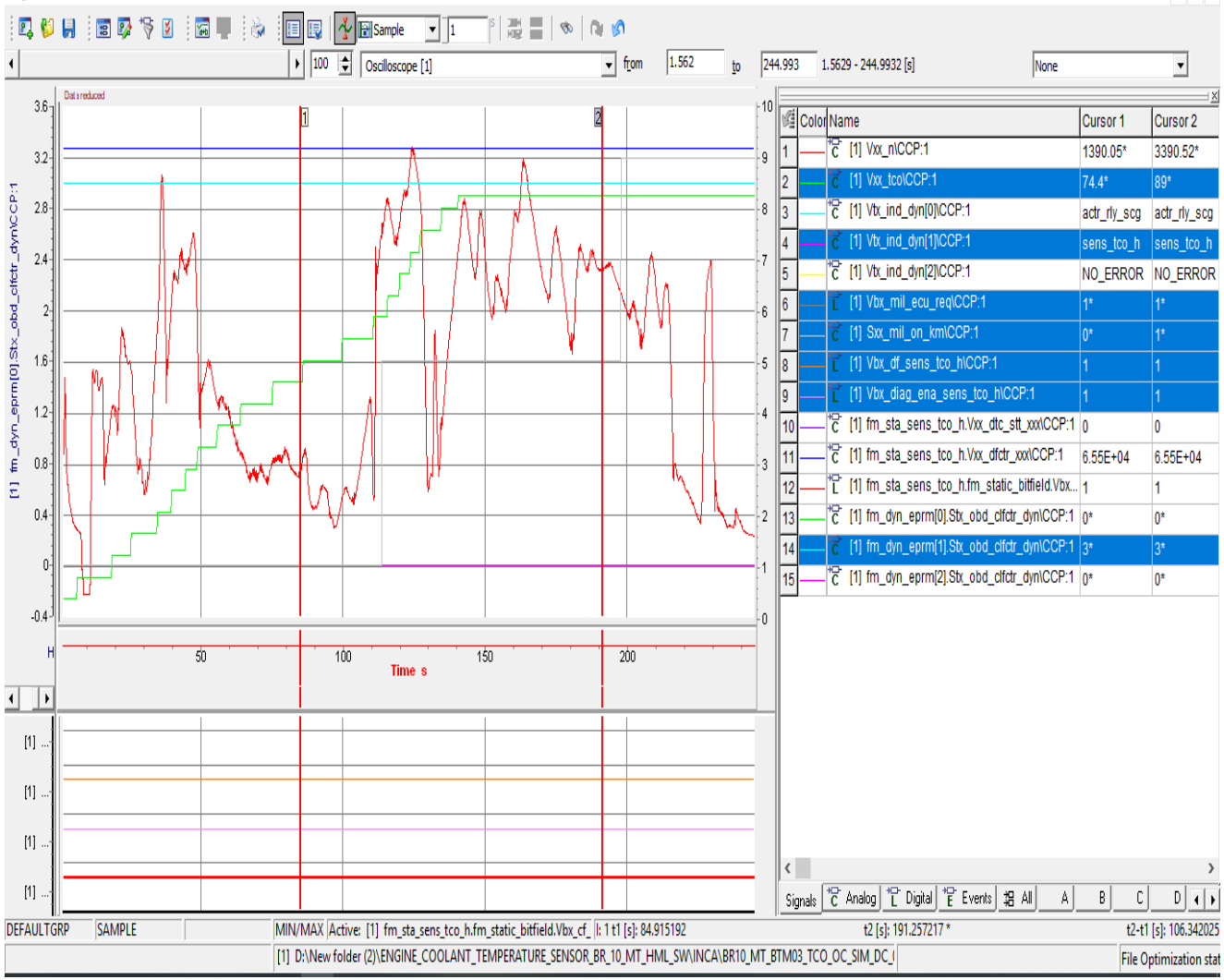
- After removing Pin B-27 in Breakout Box, Defect beat set in INCA and Immediately error flag is popped in INCA (Error Flag: sens_tco_h).
- Defect bit set as 1
- Stx_obd_clfctr_dyn counter is 1

Electrical OBD calibration: BR 10 MT
TCO Open Circuit Diagnosis – 2nd Driving cycle – INCA Measurements



- After removing Pin B-27 in Breakout Box, Defect beat set in INCA and Immediately error flag is popped in INCA (Error Flag: sens_tco_h).
- Defect bit set as 1
- Stx_obd_clfctr_dyn counter is 2

Electrical OBD calibration: BR 10 MT
TCO Open Circuit Diagnosis – 3rd Driving cycle – INCA Measurements



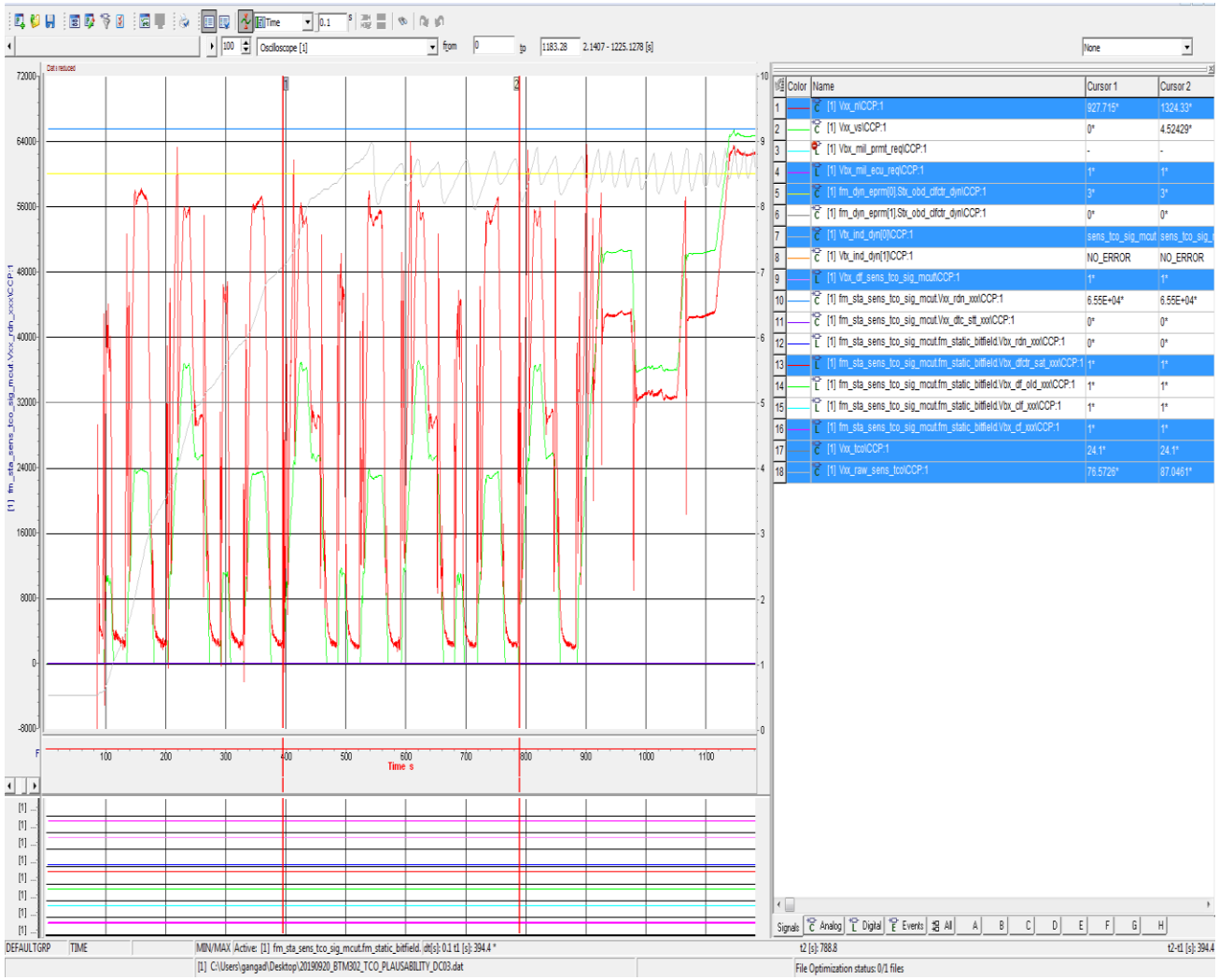
- After removing Pin B-27 in Breakout Box, Defect beat set in INCA and Immediately error flag is popped in INCA (Error Flag: sens_tco_h). After two driving cycle warm up counter is increased and MIL request is ON.
- Defect bit set as 1
- Stx_obd_clfctr_dyn counter is 3
- Effect of fault on Engine, Vehicle performance – No effect on Engine, Vehicle performance
- Again after three diving cycle error is heal and MIL request is OFF

Electrical OBD calibration: BR 10 MT
TCO Open Circuit Diagnosis – Diagra D Measurements

```
Scan-Tool Mode 2 - Current freeze frame data
--------------------------------------------

E8  ECM-EngineControl

P0118   Engine Coolant Temperature Sensor 1 Circuit High

PID 03  0000 0001       Fuel system A status
                        Open loop - has not yet satisfied conditions
        0000 0000       Fuel system B status
PID 04  100.0   %       (Value = FF)  Calculated load value
PID 05    -40   °C      Engine coolant temperature
PID 06 -100.0   %       Short term fuel trim - Bank 1
PID 07   96.9   %       Long term fuel trim - Bank 1
PID 0B     90   kPa     Intake manifold absolute pressure
PID 0C    202   1/min   Engine RPM
PID 0D      0   km/h    Vehicle speed sensor
PID 0E    4.0   °       Ignition timing advance for #1 cylinder
PID 0F     39   °C      Intake air temperature
PID 11   19.2   %       Absolute throttle position
PID 1F      0   s       Time since engine start
PID 2E    1.2   %       Commanded evaporative purge
PID 2F    0.0   %       Fuel level input
PID 33     93   kPa     Barometric pressure
PID 42  7.980   V       Control module voltage
PID 43    0.8   %       Absolute load value
PID 44  0.908   Lambda  Fuel/Air commanded equivalence ratio
PID 45    9.0   %       Relative throttle position
PID 46     20   °C      Ambient air temperature
PID 47   19.2   %       Absolute throttle position B
PID 49   15.3   %       Accelerator pedal position D
PID 4A   14.9   %       Accelerator pedal position E
PID 4C   10.2   %       Commanded throttle actuator control


Scan-Tool Mode 3 - Emission-related diagnostic trouble codes
------------------------------------------------------------

E8  ECM-EngineControl

MIL on
1 fault code entries

P0118   Engine Coolant Temperature Sensor 1 Circuit High
```

- After disconnecting the Pin B-27 (Engine Coolant Temperature Sensor 1 Circuit High) pin of EMS ECU through Brake out box error logged in mode 07 (Pending DTC data). After completion of three driving cycle the Error DTC P0118 (DTC description- Engine Coolant Temperature Sensor 1 Circuit High) got logged in mode 03 (Confirmed DTC data).

RNTBCI BR10 – OBD Calibration
TCO – Plausibility – Fault Simulation – INCA Measurements



- After fault simulation through calibration, error logged and defect bit set as 1.
- Error flag is sens_tco_sig_mcut
- After two driving cycle MIL is ON

RNTBCI BR10 – OBD Calibration
TCO – Plausibility – Fault Simulation – INCA Measurements

Controlled Pollutants - Bag

	CO	THC	NOx	CO2	CH4	NMHC
Mass [g]	3.14080	0.47133	0.31206	1254.857	0.05805	0.41188
Specific [g/km]	0.29320	0.04397	0.02911	117.141	0.00542	0.03846

Consumption (g)	406.28	**Consumption (km/l)**	19.92

Comments

- CO pass with 29.3% margin
- NOx pass with 31.9% margin
- NMHC pass with 29.4% margin

RNTBCI BR10 – OBD Calibration
TCO – Plausibility – Fault Simulation – Diagra D Measurements

```
Scan-Tool Mode 2 - Current freeze frame data
--------------------------------------------

E8  ECM-EngineControl

P0119   Engine Coolant Temperature Sensor 1 Circuit Intermittent/Erratic

PID 03  0000 0001       Fuel system A status
                        Open loop - has not yet satisfied conditions
        0000 0000       Fuel system B status
PID 04    0.0   %       Calculated load value
PID 05     63   °C      Engine coolant temperature
PID 06  -100.0  %       Short term fuel trim - Bank 1
PID 07  -100.0  %       Long term fuel trim - Bank 1
PID 0B     90   kPa     Intake manifold absolute pressure
PID 0C      0   1/min   Engine RPM
PID 0D      0   km/h    Vehicle speed sensor
PID 0E    0.0   °       Ignition timing advance for #1 cylinder
PID 0F     51   °C      Intake air temperature
PID 11   20.8   %       Absolute throttle position
PID 1F      0   s       Time since engine start
PID 2E    1.2   %       Commanded evaporative purge
PID 2F   63.5   %       Fuel level input
PID 33     93   kPa     Barometric pressure
PID 42  12.540  V       Control module voltage
PID 43    0.0   %       Absolute load value
PID 44  1.001   Lambda  Fuel/Air commanded equivalence ratio
PID 45   11.0   %       Relative throttle position
PID 46    -40   °C      Ambient air temperature
PID 47   21.2   %       Absolute throttle position B
PID 49   15.7   %       Accelerator pedal position D
PID 4A   15.7   %       Accelerator pedal position E
PID 4C   11.0   %       Commanded throttle actuator control


Scan-Tool Mode 3 - Emission-related diagnostic trouble codes
------------------------------------------------------------

E8  ECM-EngineControl

MIL on
1 fault code entries

P0119   Engine Coolant Temperature Sensor 1 Circuit Intermittent/Erratic
```

- In third driving cycle MIL is ON in Mode 3.
- Freeze frame data shown in figure
- Fault code is P0119 : Engine Coolant Temperature Sensor 1 Ckt Intermittent/Erratic

OBD calibration: BR 10 MT

Conclusion

- Following OBD Tests conducted as per Indian Legislative Norms and verified for MIL ON and for emissions within BS6 OBD Targets

  - Catalyst diagnosis
  - Misfire diagnosis
  - Upstream lambda sensor diagnosis
  - Fuel system Diagnosis
  - TCO open ckt diagnosis (Emission not taken)
  - TCO Plausibility diagnosis

- For all diagnosis, error logged in the first drive cycle

- MIL activation succesful in 3 drive cycles for all diagnosis

