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Test Cases for OBD-II Scan Tools and I/M Test Equipment

RATIONALE

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1. SCOPE

To define test cases for the OBD-II interface on external test equipment (such as an OBD-II Scan Tool, Inspection/Maintenance Tester, etc.) which can be used to verify compliance with the applicable standards such as SAE J1978 and SAE J1979 for Passenger Cars, Light-Duty Trucks, and Medium-Duty Vehicles and Engines (OBD II).

1.1 Purpose

To provide guidance to Scan Tool Manufacturers, Vehicle OEMs, and Regulators (CARB, EPA, etc.) for qualifying the OBD-II interface on external test equipment that is used for vehicle diagnostics and/or I/M testing.

2. REFERENCES

This specification takes precedence over all conflicts in the documents cited in this section.

2.1 Applicable Documents

The following publications form a part of this specification to the extent specified herein. Unless otherwise indicated, the latest issue of SAE publications shall apply.

2.1.1 SAE Publications

Available from SAE International, 400 Commonwealth Drive, Warrendale, PA 15096-0001, Tel: 877-606-7323 (inside USA and Canada) or +1 724-776-4970 (outside USA), www.sae.org.

SAE J1850	Class B Data Communications Network Interface
SAE J1930	Electrical/Electronic Systems Diagnostic Terms, Definitions, Abbreviations, and Acronyms. This is equivalent to ISO/DIS 15031-2 - Communication Between Vehicle and External Equipment for Emissions-Related Diagnostics - Part 2: Terms, definitions, abbreviations and acronyms.
SAE J1978	OBD II Scan Tool. This is equivalent to ISO/DIS 15031-4 - Communication Between Vehicle and External Equipment for Emissions-Related Diagnostics - Part 4: External test equipment.
SAE J1979	E/E Diagnostic Test Modes. This is equivalent to ISO/DIS 15031-5 (April 30, 2002) - Communication Between Vehicle and External Equipment for Emissions-Related Diagnostics - Part 5: Emissions-related diagnostic services.
SAE J2012	Diagnostic Trouble Code Definitions. This is equivalent to ISO/DIS 15031-6 (April 30, 2002) - Communication Between Vehicle and External Equipment for Emissions-Related Diagnostics - Part 6: Diagnostic trouble code definitions.
SAE J2284/3	High-Speed CAN (HSC) for Vehicle Applications at 500 KBPS
SAE J2534	Recommended Practice for Pass-Thru Vehicle Programming

2.1.2 ISO Publications

Copies of these documents are available online at <http://webstore.ansi.org/>.

ISO 9141-2	Road vehicles - Diagnostic systems - Part 2: CARB requirements for interchange of digital information
ISO 14230-4	Road vehicles - Diagnostic systems - Part 4: KWP 2000 requirements for emission related systems

ISO/DIS 15031-2	Communication Between Vehicle and External Equipment for Emissions-Related Diagnostics - Part 2: Terms, definitions, abbreviations and acronyms (equivalent to SAE J1930)
ISO/DIS 15031-3	Communication Between Vehicle and External Equipment for Emissions-Related Diagnostics - Part 3: Diagnostic connector and related electrical circuits, specification and use (equivalent to SAE J1962)
ISO/DIS 15031-4	Communication Between Vehicle and External Equipment for Emissions-Related Diagnostics (equivalent to SAE J1978)
ISO/DIS 15031-5	Communication Between Vehicle and External Equipment for Emissions-Related Diagnostics - Part 5: Emissions-related diagnostic services (equivalent to SAE J1979)
ISO/DIS 15031-6	Communication Between Vehicle and External Equipment for Emissions-Related Diagnostics - Part 6: Diagnostic trouble code definitions (equivalent to SAE J2012)
ISO 15765-4	Road vehicles - Diagnostics on Controller Area Network (CAN) - Part 4: Requirements for emissions-related systems

2.2 Related Publications

The following publications are for information purposes only and are not a required part of this document.

2.2.1 SAE Publications

Available from SAE International, 400 Commonwealth Drive, Warrendale, PA 15096-0001, Tel: 877-606-7323 (inside USA and Canada) or +1 724-776-4970 (outside USA), www.sae.org.

SAE J1699-1 SAE J1850 Verification Test Procedures

SAE J1699-3 OBD II Compliance Test Cases

2.2.2 ISO Publications

Copies of these documents are available online at <http://webstore.ansi.org/>.

ISO 11898 Road vehicles, Interchange of Digital information, Controller Area Network (CAN) for High Speed Communication

ISO 14229 Road Vehicles, Diagnostic Systems, Specification of Diagnostic Services

2.2.3 Other Publications

CARB Regulation Title 13, California Code Regulations, Section 1968.2, Malfunction and Diagnostic System Requirements for 2004 and Subsequent Model-Year Passenger Cars, Light-Duty Trucks, and Medium-Duty Vehicles and Engines (OBD II). Web address: <https://www.arb.ca.gov/msprog/obdprog/obdregs.htm>.

3. DEFINITIONS

3.1 Definition of Terms

The definitions of terms that are related to the use of this document may be found in the publications listed under 2.1, Applicable Documents.

3.2 Acronyms

The following are common acronyms used in this document:

- A/C Air Conditioning
- CAN Controller Area Network
- CALID Calibration Identification
- CID Component ID
- CVN Calibration Verification Number
- DLC Data Length Code (also Data Link Connector, e.g., SAE J1962 connector)
- DTC Diagnostic Trouble Code
- DTM Diagnostic Test Mode
- DUT Device Under Test (such as, a Generic Scan Tool, I/M Test Equipment, etc.)
- ECU Electronic Control Unit
- ECUSIM Electronic Control Unit Simulation (used to stimulate the DUT)
- HEV Hybrid Electric Vehicle
- HSC High Speed CAN
- ID Identification (number)
- I/M Inspection and Maintenance
- ISO International Standards Organization
- Kbps Kilobits per second
- KWP Key Word Protocol
- MIL Malfunction Indicator Lamp
- OBD-II On Board Diagnostics (level 2)
- OBDM On Board Diagnostic Monitor
- PCM Powertrain Control ECU
- PWM Pulse Width Modulation
- PID Parameter Identification (number)
- RPM Revolutions Per Minute (engine speed)
- SID Service ID
- TID Test ID
- VIN Vehicle Identification Number
- VPW Variable Pulse Width (modulation)

4. OVERVIEW

This document defines a set of compliance tests for OBD II Scan Tools and I/M Test Equipment. The test cases are designed to gain confidence that communications can be established and maintained with the vehicle. These tests will evaluate a variety of characteristics including mechanical attributes, electrical attributes, adherence to required protocol standards, support for required network services, and presentation of vehicle data. The requirements for these test cases are drawn from a variety of documents, but mainly focus on OBD II communication for light and medium duty vehicles as specified in SAE J1979 (ISO 15031-5).

Since OBD II Scan Tools and I/M Test Equipment have a variety of different requirements, the specific set of test cases required to verify compliance will also need to vary. For example, I/M Test Equipment may have no need to make any SID \$06 requests and therefore the test cases for SID \$06 would not be applicable (and would not be part of that device's compliance test). This document contains a super-set of test cases, from which product specific test case subsets can be selected to verify compliance.

While this document only defines the test cases, it is expected that some level of automation will need to exist to perform the test cases as described. It is envisioned that this would consist of a PC, some instrumentation, a SAE J2534-2 Interface, and some custom software.

4.1 Documentation Conventions

This document details a number of test cases, which have been divided into sections for ease of testing. The test cases that have an expected positive (or successful) result start with the phrase “Verify”. Test cases that expect a failure (or result in something other than successful) start with the phrase “Test”. Each test case consists of one or more steps. Each step (labeled “ACTION”) has and an associated evaluation criteria (labeled “EVALUATION:”).

The phrase “ACTION” shall be followed by the specific device to be used. “ECUSIM” indicates that the associated action must be applied to the ECU Simulation Device. The ECU Simulation Device provides the network messages that would typically come from a vehicle. It is envisioned that this would consist of a PC, a SAE J2534-2 Interface, and some software to operate in the manner described in the test cases. “INST” indicates that the associated action must be applied to some piece of Instrumentation (like the Power Supply, Scope, DVOM, etc.). The Instrumentation hardware could also be part of the ECU Simulation Device. “DUT” indicates that the associated action must be applied to the Device Under Test.

The evaluation criteria (“EVALUATION:”) shall identify the expected results. In some instances, it is easier to identify the criteria for passing (for example, “Pass if ...”). In these cases, any result not listed as a pass shall be considered a failure. However, in some cases it will be easier to identify the criteria for failing (for example, “Fail if ...”). In these cases, any result not listed as a failure shall be considered a pass. A test case failure is defined as the results of an individual action that does not meet the associated evaluation criteria. If a test case has failed, any remaining actions for that test case need not be executed as continuing on may produce unpredictable results.

Each test case shall have an associated Test ID. This number shall be unique and shall not change. The Test ID shall be used when referencing a test case, as section numbers in the document may change in subsequent revisions. The Test IDs have been structured to aid in automation. The Test ID is a hexadecimal number that shall have the following format with each letter representing a single hex digit:

\$GRTFFCCC

where:

G indicates the test Group (a total of 16):

- 0 for Mechanical
- 1 for Electrical
- 2 for Protocol
- 3 for Network
- 4 for Presentation

R is RESERVED and must be 0

T indicates the Type of test (a total of 16):

- 0 for General Tests
- 1 for ISO 15765-4 Tests
- 2 for ISO 14230-4 Tests
- 3 for ISO 9141-2 Tests
- 4 for SAE J1850 VPW Tests
- 5 for SAE J1850 PWM Tests

FF indicates the Feature to be tested (a total of 256):

When G = 0 (Mechanical)

- 00 for General
- 01 for Connector
- 02 for Cable

When G = 1 (Electrical)

- 00 for General
- 01 for Voltage
- 02 for Current
- 03 for Capacitance
- 04 for Impedance/Resistance
- 05 for Wave Shaping

When G = 2 (Protocol)

- 00 for General
- 01 for Bit Times
- 02 for Transport Protocol
- 03 for Initialization
- 10 for ETI Anomalies

When G = 3 (Network)

00 for General
01 for SID 1
02 for SID 2
03 for SID 3
04 for SID 4
05 for SID 5
06 for SID 6
07 for SID 7
08 for SID 8
09 for SID 9
0A for SID A
FF for ETI Anomalies

When G = 4 (Presentation)

00 for General
01 for SAE J1978

CCC indicates the specific test case number (a total of 4095)

In the body of the Test Cases, specific messages and timing parameters will be referred to by an alpha-numeric text in bold (for example, **SID\$01_PID\$00**). These references correspond to specific messages and parameter values are listed in various tables throughout Section 5.

All numbers are in decimal unless otherwise indicated. (Hexadecimal values shall have a leading '\$'; for example, \$7AF or \$800 are hexadecimal values.)

All references to protocol specific parameters that are specified in other documents will be in italics (for example, *W0*).

5. GENERAL TEST SET-UP

This section provides an overview of how the test equipment and the DUT should be setup. The 'Setup' section of each test case will describe the exact state of each piece of test equipment. Please note that not every piece of test equipment will be used in every test case. All testing shall be conducted at a temperature of 23 °C (± 5 °C) and between 25 and 95% relative humidity.

5.1 DUT Requirements

The DUT shall include all equipment required to operate in the manner described in the test cases. This shall include the mechanism used to attach to the vehicle's SAE J1962 connector.

5.2 Test Equipment Requirements

The following list of test equipment is suggested when executing the tests contained in this document. The suggested equipment will also aid in test automation. Please note that not every piece of test equipment will be required for every test.

- Dual Channel 1 GHz Oscilloscope or equivalent
- SAE J2534-2 Interface, capable of disabling CAN In-Frame Acknowledgements
- A generic PC running a Windows™ operating system and capable of executing WIN32 function calls
- Software that can run on the PC and interact with the SAE J2534-2 Interface in the manner described in the test cases (e.g., simulate the network messages that would typically come from a vehicle, etc.)
- A SAE J1962 Break-Out Box or OBD2 Splitter

- A current probe or current meter
- Calipers, a ruler, and a micrometer
- A +20 V DC (5 A) Variable Power Supply - This will provide power the ECUSIM and DUT during the tests. Additionally, this power supply shall provide power for a variety of electrical tests.

5.3 Typical Test Set-Up

Figure 1 outlines the typical set-up.

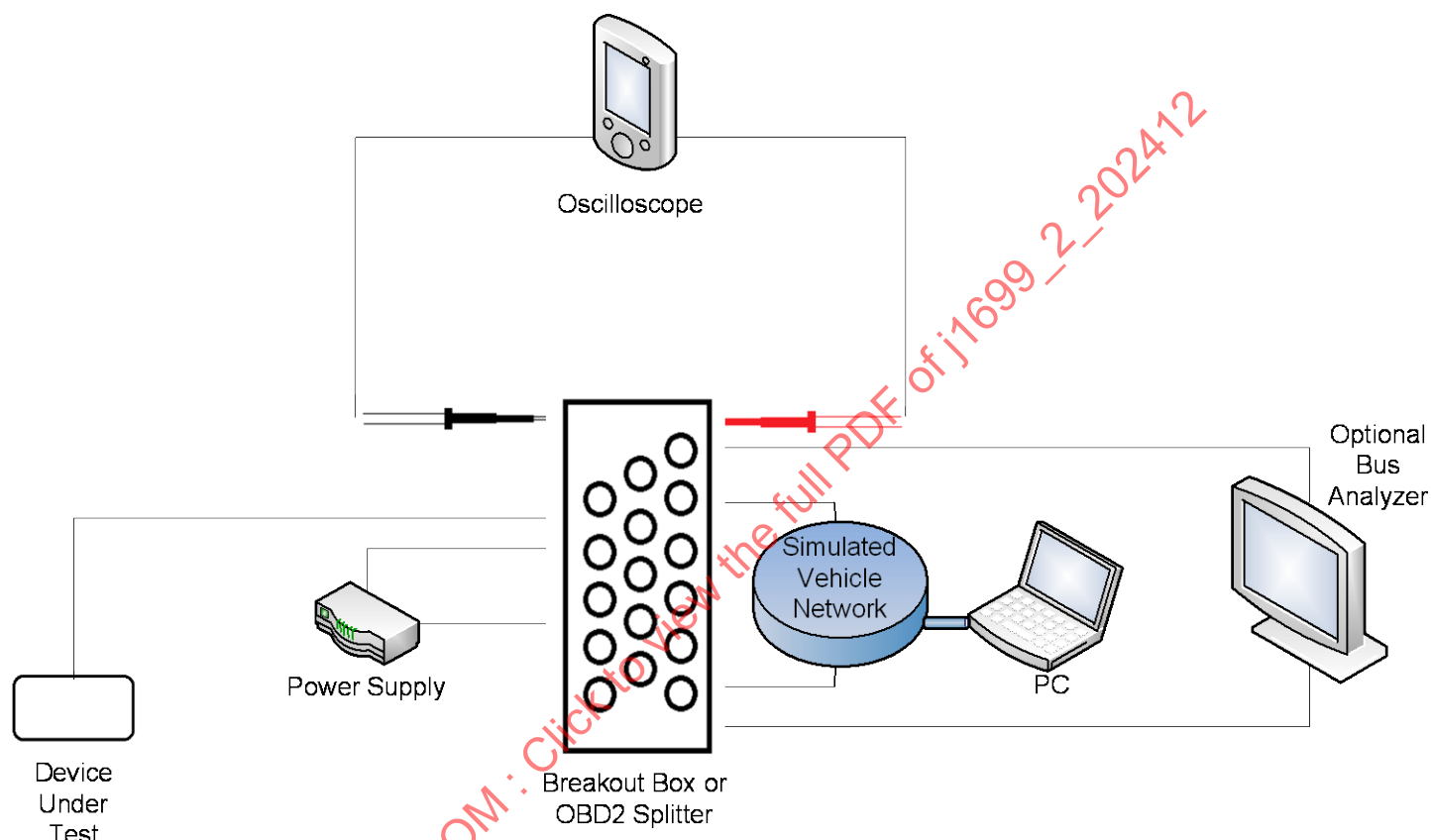


Figure 1 - Typical test set-up

5.4 Pre-Defined Messages, Message Timing, and Test Set-Up States

5.4.1 General States

5.4.1.1 Power On

The Power On state is immediately after power up when the device is connected, but there is no active OBD communication.

5.4.2 CAN

5.4.2.1 CAN Electrical Connections

Figure 2 outlines the typical set-up for CAN testing.

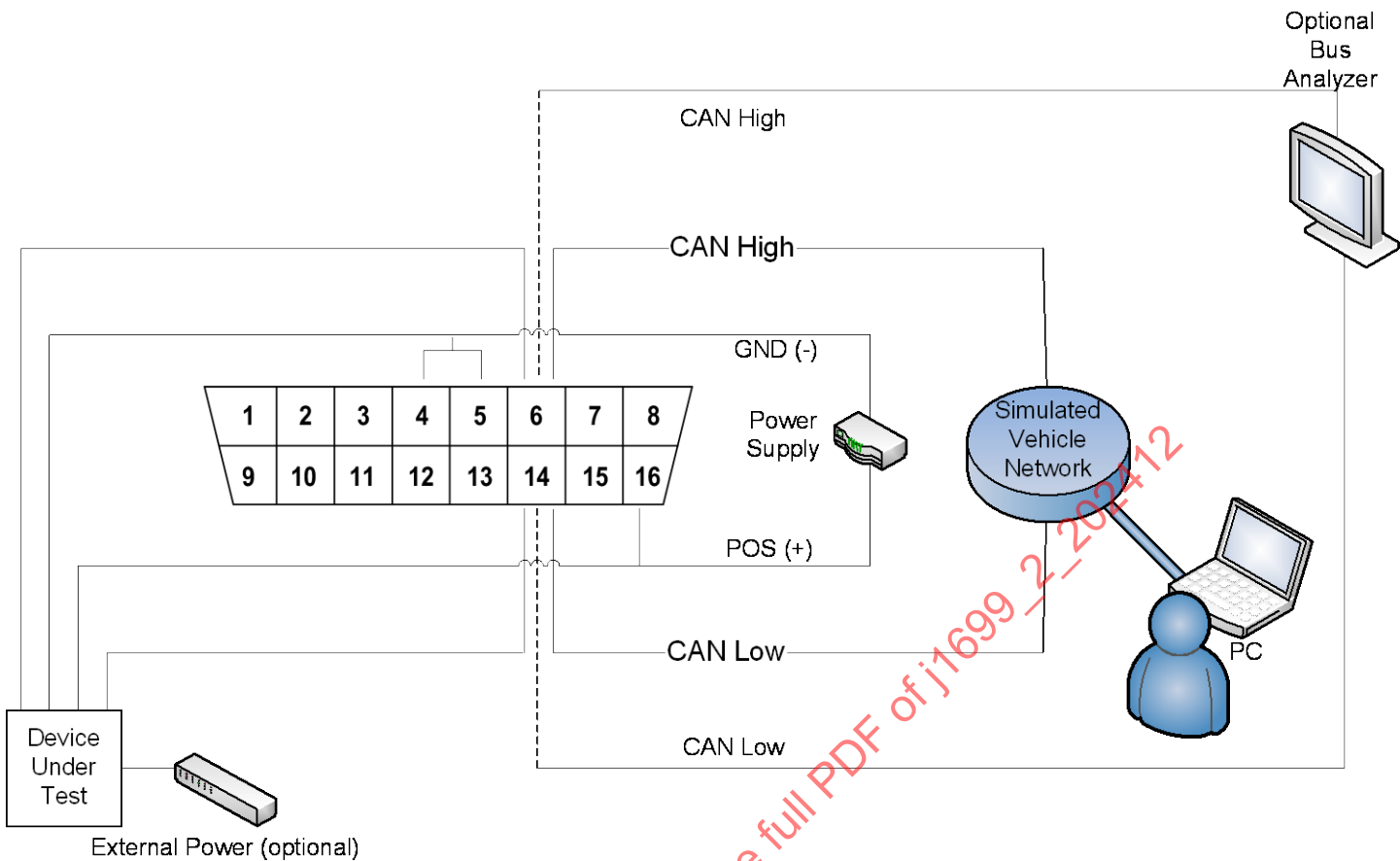


Figure 2 - Test set up for CAN testing

5.4.2.2 CAN ECU Addresses

At this time, none have been defined.

5.4.2.3 CAN Messages

The following messages have been pre-defined for 11-bit CAN. For convenience, the test cases in this document will use the text in the 'Message Reference' column when referring to the specific set of message bytes, detailed in the 'Message Bytes' column of the table below.

Message Reference	Message Bytes
CAN 11 SID\$09 INF\$04	\$00 \$00 \$07 \$DF \$02 \$09 \$04
CAN 11 FC BSO STMIN0	\$00 \$00 \$07 \$DF \$30 \$00 \$00
CAN 11 ECU1 SID\$09 INF\$04 FF	\$00 \$00 \$07 \$E8 \$10 \$13 \$49 \$04 \$01 \$31 \$32 \$35

The first four bytes are the CAN ID bits 28-24 first, followed by CAN ID bits 23-16, CAN ID bits 15-8, CAN ID bits 7-0.

Figure 3 - Pre-defined messages for CAN (11-bit)

5.4.2.4 CAN Message Timing

At this time, none have been defined.

5.4.2.5 CAN (11-bit, 500K) Connected State

The device shall initially be in the 'Power On' state, connected to the CAN network with the appropriate termination (as depicted in 5.4.3.1), then configured for 11-bit CAN Identifiers at a baud rate of 500000.

5.4.3 ISO 15765-4

5.4.3.1 ISO 15765-4 Electrical Connections

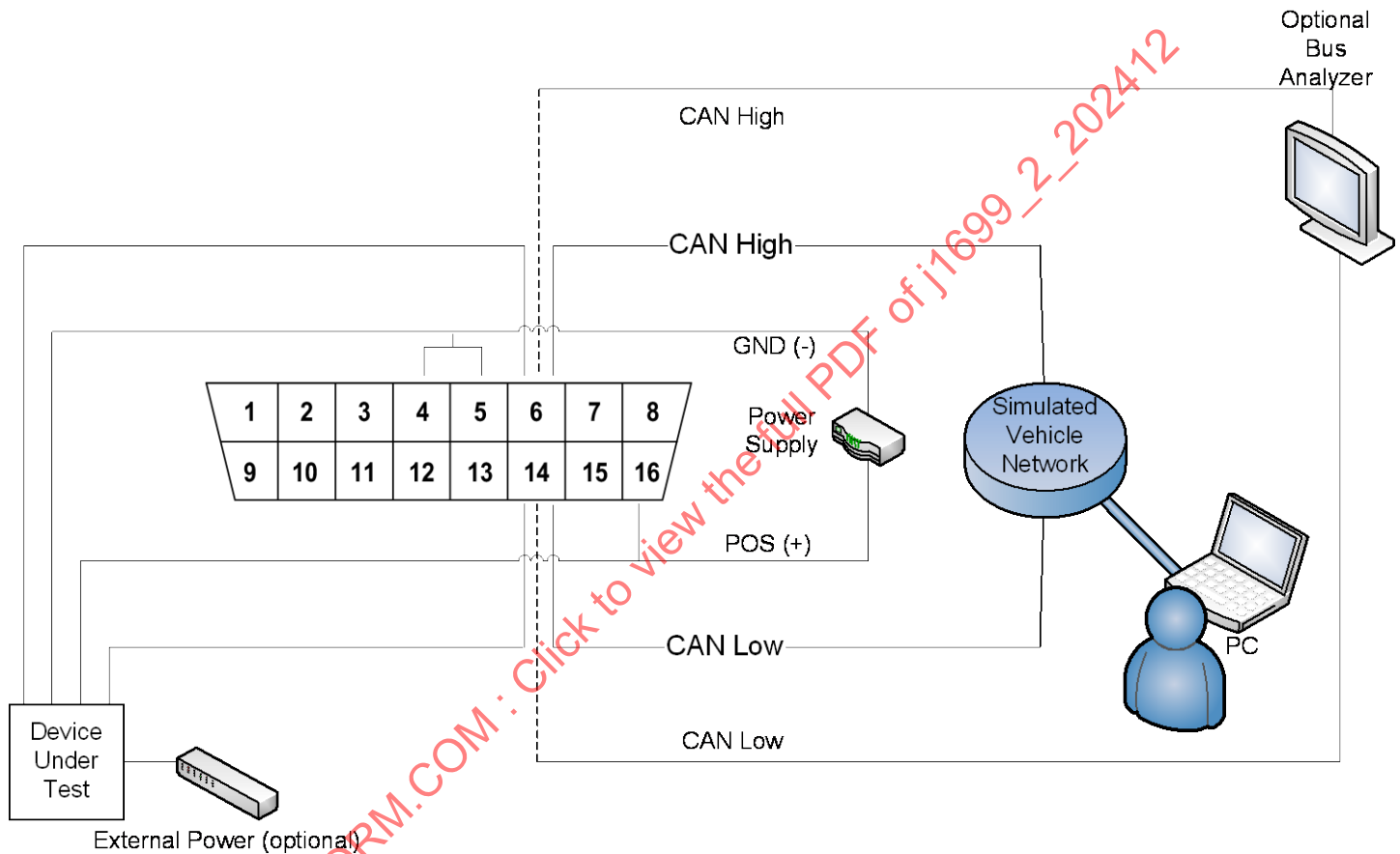


Figure 4 - Test set-up for ISO 15765-4 testing

5.4.3.2 ISO 15765-4 ECU Addresses

The following address bytes have been pre-defined for 11-bit ISO 15765-4. For convenience, the test cases in this document will use the text in the 'ECU Reference' column when referring to the specific set of address bytes, detailed in the 'Address Bytes' column of the table below.

ECU Reference	Address Bytes
ECU #1	\$00 \$00 \$07 \$E8
ECU #2	\$00 \$00 \$07 \$E9
ECU #3	\$00 \$00 \$07 \$EA
ECU #4	\$00 \$00 \$07 \$EB
ECU #5	\$00 \$00 \$07 \$EC
ECU #6	\$00 \$00 \$07 \$ED
ECU #7	\$00 \$00 \$07 \$EE
ECU #8	\$00 \$00 \$07 \$EF

The first four bytes are the CAN ID bits 28-24 first, followed by CAN ID bits 23-16, CAN ID bits 15-8, CAN ID bits 7-0.

Figure 5 - ECU reference and associated addresses for ISO 15765-4 (11-bit)

The following address bytes have been pre-defined for 29-bit ISO 15765-4. For convenience, the test cases in this document will use the text in the 'ECU Reference' column when referring to the specific set of address bytes, detailed in the 'Address Bytes' column of the table below.

ECU Reference	Address Bytes
ECU #1	\$18 \$DA \$F1 \$10
ECU #2	\$18 \$DA \$F1 \$11
ECU #3	\$18 \$DA \$F1 \$12
ECU #4	\$18 \$DA \$F1 \$13
ECU #5	\$18 \$DA \$F1 \$14
ECU #6	\$18 \$DA \$F1 \$15
ECU #7	\$18 \$DA \$F1 \$16
ECU #8	\$18 \$DA \$F1 \$17

The first four bytes are the CAN ID bits 28-24 first, followed by CAN ID bits 23-16, CAN ID bits 15-8, CAN ID bits 7-0.

Figure 6 - ECU reference and associated addresses for ISO 15765-4 (29-bit)

5.4.3.3 ISO 15765-4 Messages

The following messages have been pre-defined for 11-bit ISO 15765-4. These messages represent the fully assembled message and do not include any transport layer mechanisms that appear in the individual CAN Frames (like the PCI byte, Flow Control messages, etc.). For convenience, the test cases in this document will use the text in the 'Message Reference' column when referring to the specific set of message bytes, detailed in the 'Message Bytes' column of the table below.

Message Reference	Message Bytes
15765 11 SID\$01 PID\$00	\$00 \$00 \$07 \$DF \$01 \$00
15765_11_SID\$01_PID\$00-\$E0	\$00 \$00 \$07 \$DF \$01 \$00 \$20 \$40 \$60 \$80 \$A0 \$C0 \$E0
15765 11 SID\$01 PID\$01	\$00 \$00 \$07 \$DF \$01 \$01
15765 11 SID\$01 PID\$0C	\$00 \$00 \$07 \$DF \$01 \$0C
15765 11 SID\$01 PID\$20	\$00 \$00 \$07 \$DF \$01 \$20
15765 11 SID\$01 PID\$40	\$00 \$00 \$07 \$DF \$01 \$40
15765 11 SID\$01 PID\$41	\$00 \$00 \$07 \$DF \$01 \$41
15765 11 SID\$01 PID\$01-\$0C-\$41	\$00 \$00 \$07 \$DF \$01 \$01 \$0C \$41
15765 11 ECU1 SID\$01 PID\$00	\$00 \$00 \$07 \$E8 \$41 \$00 \$80 \$10 \$00 \$00
15765 11 ECU1 SID\$01 PID\$00 20	\$00 \$00 \$07 \$E8 \$41 \$00 \$80 \$10 \$00 \$01
15765_11_ECU1_SID\$01_PID\$00-\$0E	\$00 \$00 \$07 \$E8 \$41 \$00 \$80 \$00 \$00 \$00 \$20 \$00 \$00 \$00 \$01 \$40 \$10 \$00 \$00 \$00
15765 11 ECU1 SID\$01 PID\$01	\$00 \$00 \$07 \$E8 \$41 \$01 \$00 \$07 \$EF \$EF
15765 11 ECU1 SID\$01 PID\$01 SPARK	\$00 \$00 \$07 \$E8 \$41 \$01 \$00 \$07 \$EF \$EF
15765 11 ECU1 SID\$01 PID\$01 COMP	\$00 \$00 \$07 \$E8 \$41 \$01 \$00 \$0F \$EB \$EB
15765 11 ECU1 SID\$01 PID\$0C KOEO	\$00 \$00 \$07 \$E8 \$41 \$0C \$00 \$00
15765 11 ECU1 SID\$01 PID\$20	\$00 \$00 \$07 \$E8 \$41 \$20 \$00 \$00 \$00 \$01
15765 11 ECU1 SID\$01 PID\$40	\$00 \$00 \$07 \$E8 \$41 \$40 \$10 \$00 \$00 \$00
15765 11 ECU1 SID\$01 PID\$41 SPARK	\$00 \$00 \$07 \$E8 \$41 \$41 \$00 \$07 \$EF \$EF
15765_11_ECU1_SID\$01_PID\$01-\$0C-\$41	\$00 \$00 \$07 \$E8 \$41 \$01 \$00 \$07 \$EF \$EF \$0C \$00 \$00 \$41 \$00 \$07 \$EF \$EF
15765 11 ECU1 SID\$01 NRC\$21	\$00 \$00 \$07 \$E8 \$7F \$01 \$21
15765 11 ECU2 SID\$01 PID\$00	\$00 \$00 \$07 \$E9 \$41 \$00 \$80 \$10 \$00 \$00
15765 11 ECU2 SID\$01 PID\$01 SPARK	\$00 \$00 \$07 \$E9 \$41 \$01 \$81 \$44 \$00 \$00
15765 11 ECU2 SID\$01 PID\$01 COMP	\$00 \$00 \$07 \$E9 \$41 \$01 \$81 \$4C \$00 \$00
15765 11 ECU2 SID\$01 PID\$0C KOEO	\$00 \$00 \$07 \$E9 \$41 \$0C \$00 \$00
15765 11 ECU3 SID\$01 PID\$00	\$00 \$00 \$07 \$EA \$41 \$00 \$00 \$00 \$00 \$00
15765 11 ECU4 SID\$01 PID\$00	\$00 \$00 \$07 \$EB \$41 \$00 \$00 \$00 \$00 \$00
15765 11 ECU5 SID\$01 PID\$00	\$00 \$00 \$07 \$EC \$41 \$00 \$00 \$00 \$00 \$00
15765 11 ECU6 SID\$01 PID\$00	\$00 \$00 \$07 \$ED \$41 \$00 \$00 \$00 \$00 \$00
15765 11 ECU7 SID\$01 PID\$00	\$00 \$00 \$07 \$EE \$41 \$00 \$00 \$00 \$00 \$00
15765 11 ECU8 SID\$01 PID\$00	\$00 \$00 \$07 \$EF \$41 \$00 \$00 \$00 \$00 \$00
15765 11 SID\$02 PID\$02	\$00 \$00 \$07 \$DF \$02 \$02 \$00
15765 11 ECU1 SID\$02 PID\$02 NoDTC	\$00 \$00 \$07 \$E8 \$42 \$02 \$00 \$00 \$00
15765 11 ECU2 SID\$02 PID\$02 NoDTC	\$00 \$00 \$07 \$E9 \$42 \$02 \$00 \$00 \$00
15765 11 ECU1 SID\$02 PID\$02 DTC	\$00 \$00 \$07 \$E8 \$42 \$02 \$00 \$01 \$07
15765 11 SID\$03	\$00 \$00 \$07 \$DF \$03
15765 11 ECU1 SID\$03 NoDTC	\$00 \$00 \$07 \$E8 \$43 \$00
15765_11_ECU1_SID\$03_DTC	\$00 \$00 \$07 \$E8 \$43 \$04 \$01 \$07 \$01 \$10 \$01 \$15 \$01 \$24
15765 11 ECU2 SID\$03 NoDTC	\$00 \$00 \$07 \$E9 \$43 \$00
15765 11 SID\$04	\$00 \$00 \$07 \$DF \$04
15765 11 ECU1 SID\$04 DONE	\$00 \$00 \$07 \$E8 \$44
15765 11 ECU1 SID\$04 NRC22	\$00 \$00 \$07 \$E8 \$7F \$44 \$22
15765 11 ECU1 SID\$04 NRC78	\$00 \$00 \$07 \$E8 \$7F \$44 \$78
15765 11 ECU2 SID\$04 DONE	\$00 \$00 \$07 \$E9 \$44
15765 11 ECU2 SID\$04 NRC22	\$00 \$00 \$07 \$E9 \$7F \$44 \$22
15765 11 SID\$06 MID\$00	\$00 \$00 \$07 \$DF \$06 \$00
15765 11 ECU1 SID\$06 MID\$00	\$00 \$00 \$07 \$E8 \$46 \$00 \$CC \$00 \$00 \$00
15765 11 SID\$07	\$00 \$00 \$07 \$DF \$07

15765_11_ECU1_SID\$07_NoDTC	\$00 \$00 \$07 \$E8 \$47 \$00
15765_11_ECU1_SID\$07_DTC	\$00 \$00 \$07 \$E8 \$47 \$04 \$01 \$07 \$01 \$10 \$01 \$15 \$01 \$24
15765_11_ECU2_SID\$07_NoDTC	\$00 \$00 \$07 \$E9 \$47 \$00
15765_11_SID\$08_TID\$00	\$00 \$00 \$07 \$DF \$08
15765_11_ECU1_SID\$08_TID\$00	\$00 \$00 \$07 \$E8 \$48 \$00 \$80 \$00 \$00 \$00
15765_11_SID\$09_INF\$00	\$00 \$00 \$07 \$DF \$09 \$00
15765_11_SID\$09_INF\$02	\$00 \$00 \$07 \$DF \$09 \$02
15765_11_SID\$09_INF\$04	\$00 \$00 \$07 \$DF \$09 \$04
15765_11_SID\$09_INF\$06	\$00 \$00 \$07 \$DF \$09 \$06
15765_11_SID\$09_INF\$08	\$00 \$00 \$07 \$DF \$09 \$08
15765_11_SID\$09_INF\$0A	\$00 \$00 \$07 \$DF \$09 \$0A
15765_11_SID\$09_INF\$0B	\$00 \$00 \$07 \$DF \$09 \$0B
15765_11_SID\$09_INF\$0D	\$00 \$00 \$07 \$DF \$09 \$0D
15765_11_SID\$09_INF\$0F	\$00 \$00 \$07 \$DF \$09 \$0F
15765_11_ECU1_SID\$09_INF\$00	\$00 \$00 \$07 \$E8 \$49 \$00 \$55 \$40 \$00 \$00
15765_11_ECU1_SID\$09_INF\$00_DIESEL	\$00 \$00 \$07 \$E8 \$49 \$00 \$54 \$6A \$00 \$00
15765_11_ECU1_SID\$09_INF\$02	\$00 \$00 \$07 \$E8 \$49 \$02 \$01 \$31 \$47 \$59 \$44 \$45 \$36 \$33 \$41 \$37 \$41 \$30 \$30 \$30 \$30 \$30 \$30
15765_11_ECU1_SID\$09_INF\$04	\$00 \$00 \$07 \$E8 \$49 \$04 \$01 \$31 \$32 \$35 \$38 \$39 \$37 \$37 \$32 \$00 \$00 \$00 \$00 \$00 \$00 \$00 \$00
15765_11_ECU1_SID\$09_INF\$04_9	\$00 \$00 \$07 \$E8 \$49 \$04 \$09 \$31 \$31 \$35 \$38 \$39 \$37 \$37 \$38 \$00 \$00 \$00 \$00 \$00 \$00 \$00 \$00 \$32 \$31 \$35 \$38 \$39 \$37 \$37 \$37 \$00 \$00 \$00 \$00 \$00 \$00 \$00 \$00 \$00 \$33 \$31 \$35 \$38 \$39 \$37 \$37 \$36 \$00 \$00 \$00 \$00 \$00 \$00 \$00 \$00 \$34 \$31 \$35 \$38 \$39 \$37 \$37 \$35 \$00 \$00 \$00 \$00 \$00 \$00 \$00 \$00 \$00 \$35 \$31 \$35 \$38 \$39 \$37 \$37 \$34 \$00 \$00 \$00 \$00 \$00 \$00 \$00 \$00 \$36 \$31 \$35 \$38 \$39 \$37 \$37 \$33 \$00 \$00 \$00 \$00 \$00 \$00 \$00 \$00 \$37 \$31 \$35 \$38 \$39 \$37 \$37 \$32 \$00 \$00 \$00 \$00 \$00 \$00 \$00 \$00 \$38 \$31 \$35 \$38 \$39 \$37 \$37 \$31 \$00 \$00 \$00 \$00 \$00 \$00 \$00 \$00 \$39 \$31 \$35 \$38 \$39 \$37 \$37 \$30 \$00 \$00 \$00 \$00 \$00 \$00 \$00 \$00
15765_11_ECU1_SID\$09_INF\$06	\$00 \$00 \$07 \$E8 \$49 \$06 \$01 \$17 \$91 \$BC \$88
15765_11_ECU1_SID\$09_INF\$06_9	\$00 \$00 \$07 \$E8 \$49 \$06 \$09 \$17 \$91 \$BC \$88 \$18 \$91 \$BC \$87 \$19 \$91 \$BC \$86 \$1A \$91 \$BC \$85 \$1B \$91 \$BC \$84 \$1C \$91 \$BC \$83 \$1D \$91 \$BC \$82 \$1E \$55 \$AA \$81 \$1F \$FF \$00 \$80
15765_11_ECU1_SID\$09_INF\$08_32	\$00 \$00 \$07 \$E8 \$49 \$08 \$10 \$00 \$64 \$00 \$69 \$00 \$0A \$00 \$0F \$00 \$00 \$00 \$00 \$00 \$1E \$00 \$23 \$00 \$00 \$00 \$00 \$00 \$00 \$32 \$00 \$37 \$00 \$3C \$00 \$41 \$00 \$46 \$00 \$4B
15765_11_ECU1_SID\$09_INF\$08_40	\$00 \$00 \$07 \$E8 \$49 \$08 \$14 \$00 \$64 \$00 \$69 \$00 \$0A \$00 \$0F \$00 \$00 \$00 \$00 \$00 \$1E \$00 \$23 \$00 \$00 \$00 \$00 \$00 \$00 \$32 \$00 \$37 \$00 \$3C \$00 \$41 \$00 \$46 \$00 \$4B \$00 \$5A \$00 \$5F \$00 \$00 \$00 \$00
15765_11_ECU1_SID\$09_INF\$0A	\$00 \$00 \$07 \$E8 \$49 \$0A \$01 \$45 \$43 \$4D \$31 \$2D \$45 \$6E \$67 \$69 \$6E \$65 \$43 \$6F \$6E \$74 \$72 \$6F \$6C \$31 \$00
15765_11_ECU1_SID\$09_INF\$0B_32	\$00 \$00 \$07 \$E8 \$49 \$0B \$10 \$00 \$64 \$00 \$69 \$00 \$0A \$00 \$0F \$00 \$00 \$00 \$00 \$00 \$00 \$00 \$00 \$00 \$00 \$00 \$00 \$00 \$32 \$00 \$37 \$00 \$3C \$00 \$41 \$00 \$46 \$00 \$4B
15765_11_ECU1_SID\$09_INF\$0B_36	\$00 \$00 \$07 \$E8 \$49 \$0B \$12 \$00 \$64 \$00 \$69 \$00 \$0A \$00 \$0F \$00 \$00 \$00 \$00 \$00 \$00 \$00 \$00 \$00 \$00 \$00 \$00 \$00 \$32 \$00 \$37 \$00 \$3C \$00 \$41 \$00 \$46 \$00 \$4B \$00 \$50 \$00 \$55

15765_11_ECU1_SID\$09_INF\$0D	\$00 \$00 \$07 \$E8 \$49 \$0D \$01 \$00 \$00 \$00 \$00 \$56 \$41 \$4C \$44 \$45 \$53 \$4E \$39 \$38 \$37 \$36 \$35 \$31
15765_11_ECU1_SID\$09_INF\$0F	\$00 \$00 \$07 \$E8 \$49 \$0F \$01 \$00 \$00 \$00 \$00 \$00 \$00 \$00 \$56 \$41 \$4C \$44 \$45 \$52 \$54 \$41 \$4E \$31
15765_11_ECU1_SID\$09_NRC78	\$00 \$00 \$07 \$E8 \$7F \$49 \$78
15765_11_ECU2_SID\$09_INF\$00	\$00 \$00 \$07 \$E9 \$49 \$00 \$15 \$40 \$00 \$00
15765_11_ECU2_SID\$09_INF\$00_DIESEL	\$00 \$00 \$07 \$E9 \$49 \$00 \$14 \$6A \$00 \$00
15765_11_ECU2_SID\$09_INF\$04	\$00 \$00 \$07 \$E9 \$49 \$04 \$01 \$32 \$34 \$32 \$32 \$31 \$34 \$31 \$39 \$00 \$00 \$00 \$00 \$00 \$00 \$00 \$00
15765_11_ECU2_SID\$09_INF\$04_9	\$00 \$00 \$07 \$E9 \$49 \$04 \$09 \$31 \$32 \$35 \$38 \$39 \$37 \$37 \$38 \$00 \$00 \$00 \$00 \$00 \$00 \$00 \$00 \$32 \$32 \$35 \$38 \$39 \$37 \$37 \$37 \$00 \$00 \$00 \$00 \$00 \$00 \$00 \$00 \$33 \$32 \$35 \$38 \$39 \$37 \$37 \$36 \$00 \$00 \$00 \$00 \$00 \$00 \$00 \$34 \$32 \$35 \$38 \$39 \$37 \$37 \$35 \$00 \$00 \$00 \$00 \$00 \$00 \$00 \$00 \$35 \$32 \$35 \$38 \$39 \$37 \$37 \$34 \$00 \$00 \$00 \$00 \$00 \$00 \$00 \$36 \$32 \$35 \$38 \$39 \$37 \$37 \$33 \$00 \$00 \$00 \$00 \$00 \$00 \$00 \$37 \$32 \$35 \$38 \$39 \$37 \$37 \$32 \$00 \$00 \$00 \$00 \$00 \$00 \$00 \$38 \$32 \$35 \$38 \$39 \$37 \$37 \$31 \$00 \$00 \$00 \$00 \$00 \$00 \$00 \$39 \$32 \$35 \$38 \$39 \$37 \$37 \$30 \$00 \$00 \$00 \$00 \$00 \$00 \$00
15765_11_ECU2_SID\$09_INF\$06	\$00 \$00 \$07 \$E9 \$49 \$06 \$01 \$27 \$91 \$BC \$88
15765_11_ECU2_SID\$09_INF\$06_9	\$00 \$00 \$07 \$E9 \$49 \$06 \$09 \$27 \$91 \$BC \$88 \$28 \$91 \$BC \$87 \$29 \$91 \$BC \$86 \$2A \$91 \$BC \$85 \$2B \$91 \$BC \$84 \$2C \$91 \$BC \$83 \$2D \$91 \$BC \$82 \$2E \$55 \$AA \$81 \$2F \$FF \$00 \$80
15765_11_ECU2_SID\$09_INF\$08_32	\$00 \$00 \$07 \$E9 \$49 \$08 \$10 \$00 \$64 \$00 \$69 \$00 \$00 \$00 \$00 \$00 \$14 \$00 \$19 \$00 \$00 \$00 \$00 \$00 \$28 \$00 \$2D \$00 \$00 \$00 \$00 \$00 \$00 \$00 \$00 \$00 \$00 \$00
15765_11_ECU2_SID\$09_INF\$08_40	\$00 \$00 \$07 \$E9 \$49 \$08 \$14 \$00 \$64 \$00 \$69 \$00 \$00 \$00 \$00 \$00 \$14 \$00 \$19 \$00 \$00 \$00 \$00 \$00 \$28 \$00 \$2D \$00 \$00 \$00 \$00 \$00 \$00 \$00 \$00 \$00 \$00 \$00 \$5A \$00 \$5F
15765_11_ECU2_SID\$09_INF\$0A	\$00 \$00 \$07 \$E9 \$49 \$0A \$01 \$45 \$43 \$4D \$32 \$2D \$45 \$6E \$67 \$69 \$6E \$65 \$43 \$6F \$6E \$74 \$72 \$6F \$6C \$32 \$00
15765_11_ECU2_SID\$09_INF\$0B_32	\$00 \$00 \$07 \$E9 \$49 \$0B \$10 \$00 \$64 \$00 \$69 \$00 \$00 \$00 \$00 \$00 \$14 \$00 \$19 \$00 \$00 \$00 \$00 \$00 \$28 \$00 \$2D \$00 \$00 \$00 \$00 \$00 \$00 \$00 \$00 \$00 \$00 \$00
15765_11_ECU2_SID\$09_INF\$0B_36	\$00 \$00 \$07 \$E9 \$49 \$0B \$12 \$00 \$64 \$00 \$69 \$00 \$00 \$00 \$00 \$00 \$14 \$00 \$19 \$00 \$00 \$00 \$00 \$00 \$28 \$00 \$2D \$00 \$00 \$00 \$00 \$00 \$00 \$00 \$00 \$00 \$00 \$00
15765_11_ECU2_SID\$09_INF\$0D	\$00 \$00 \$07 \$E9 \$49 \$0D \$01 \$00 \$00 \$00 \$00 \$56 \$41 \$4C \$44 \$45 \$53 \$4E \$39 \$38 \$37 \$36 \$35 \$32
15765_11_ECU2_SID\$09_INF\$0F	\$00 \$00 \$07 \$E9 \$49 \$0F \$01 \$00 \$00 \$00 \$00 \$00 \$00 \$00 \$56 \$41 \$4C \$44 \$45 \$52 \$54 \$41 \$4E \$32
15765_11_ECU3_SID\$09_INF\$00	\$00 \$00 \$07 \$EA \$49 \$00 \$14 \$40 \$00 \$00
15765_11_ECU3_SID\$09_INF\$00_DIESEL	\$00 \$00 \$07 \$EA \$49 \$00 \$14 \$4A \$00 \$00
15765_11_ECU3_SID\$09_INF\$04_9	\$00 \$00 \$07 \$EA \$49 \$04 \$09 \$31 \$33 \$35 \$38 \$39 \$37 \$37 \$38 \$00 \$00 \$00 \$00 \$00 \$00 \$00 \$00 \$32 \$33 \$35 \$38 \$39 \$37 \$37 \$37 \$00 \$00 \$00 \$00

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15765_11_ECU3_SID\$09_INF\$06_9	\$00 \$00 \$07 \$EA \$49 \$06 \$09 \$37 \$91 \$BC \$88 \$38 \$91 \$BC \$87 \$39 \$91 \$BC \$86 \$3A \$91 \$BC \$85 \$3B \$91 \$BC \$84 \$3C \$91 \$BC \$83 \$3D \$91 \$BC \$82 \$3E \$55 \$AA \$81 \$3F \$FF \$00 \$80
15765_11_ECU3_SID\$09_INF\$0A	\$00 \$00 \$07 \$EA \$49 \$0A \$01 \$54 \$43 \$4D \$31 \$2D \$54 \$72 \$61 \$6E \$73 \$6D \$69 \$73 \$43 \$74 \$72 \$6C \$31 \$00 \$00
15765_11_ECU3_SID\$09_INF\$0D	\$00 \$00 \$07 \$EA \$49 \$0D \$01 \$00 \$00 \$00 \$00 \$56 \$41 \$4C \$44 \$45 \$53 \$4E \$39 \$38 \$37 \$36 \$35 \$33
15765_11_ECU3_SID\$09_INF\$0F	\$00 \$00 \$07 \$EA \$49 \$0F \$01 \$00 \$00 \$00 \$00 \$00 \$00 \$00 \$56 \$41 \$4C \$44 \$45 \$52 \$54 \$41 \$4E \$33
15765_11_ECU4_SID\$09_INF\$00	\$00 \$00 \$07 \$EB \$49 \$00 \$14 \$40 \$00 \$00
15765_11_ECU4_SID\$09_INF\$00_DIESEL	\$00 \$00 \$07 \$EB \$49 \$00 \$14 \$4A \$00 \$00
15765_11_ECU4_SID\$09_INF\$04_9	\$00 \$00 \$07 \$EB \$49 \$04 \$09 \$31 \$34 \$35 \$38 \$39 \$37 \$37 \$38 \$00 \$00 \$00 \$00 \$00 \$00 \$00 \$00 \$32 \$34 \$35 \$38 \$39 \$37 \$37 \$37 \$00 \$00 \$00 \$00 \$00 \$00 \$00 \$00 \$33 \$34 \$35 \$38 \$39 \$37 \$37 \$36 \$00 \$00 \$00 \$00 \$00 \$00 \$00 \$00 \$34 \$34 \$35 \$38 \$39 \$37 \$37 \$35 \$00 \$00 \$00 \$00 \$00 \$00 \$00 \$00 \$35 \$34 \$35 \$38 \$39 \$37 \$37 \$34 \$00 \$00 \$00 \$00 \$00 \$00 \$00 \$00 \$36 \$34 \$35 \$38 \$39 \$37 \$37 \$33 \$00 \$00 \$00 \$00 \$00 \$00 \$00 \$00 \$37 \$34 \$35 \$38 \$39 \$37 \$37 \$32 \$00 \$00 \$00 \$00 \$00 \$00 \$00 \$00 \$38 \$34 \$35 \$38 \$39 \$37 \$37 \$31 \$00 \$00 \$00 \$00 \$00 \$00 \$00 \$00 \$39 \$34 \$35 \$38 \$39 \$37 \$37 \$30 \$00 \$00 \$00 \$00 \$00 \$00 \$00 \$00
15765_11_ECU4_SID\$09_INF\$06_9	\$00 \$00 \$07 \$EB \$49 \$06 \$09 \$47 \$91 \$BC \$88 \$48 \$91 \$BC \$87 \$49 \$91 \$BC \$86 \$4A \$91 \$BC \$85 \$4B \$91 \$BC \$84 \$4C \$91 \$BC \$83 \$4D \$91 \$BC \$82 \$4E \$55 \$AA \$81 \$4F \$FF \$00 \$80
15765_11_ECU4_SID\$09_INF\$0A	\$00 \$00 \$07 \$EB \$49 \$0A \$01 \$45 \$43 \$43 \$31 \$2D \$45 \$6D \$69 \$73 \$43 \$72 \$69 \$74 \$49 \$6E \$66 \$6F \$31 \$00 \$00
15765_11_ECU4_SID\$09_INF\$0D	\$00 \$00 \$07 \$EB \$49 \$0D \$01 \$00 \$00 \$00 \$00 \$56 \$41 \$4C \$44 \$45 \$53 \$4E \$39 \$38 \$37 \$36 \$35 \$34
15765_11_ECU4_SID\$09_INF\$0F	\$00 \$00 \$07 \$EB \$49 \$0F \$01 \$00 \$00 \$00 \$00 \$00 \$00 \$00 \$56 \$41 \$4C \$44 \$45 \$52 \$54 \$41 \$4E \$34
15765_11_ECU5_SID\$09_INF\$00	\$00 \$00 \$07 \$EC \$49 \$00 \$14 \$40 \$00 \$00
15765_11_ECU5_SID\$09_INF\$00_DIESEL	\$00 \$00 \$07 \$EC \$49 \$00 \$14 \$4A \$00 \$00
15765_11_ECU5_SID\$09_INF\$04_9	\$00 \$00 \$07 \$EC \$49 \$04 \$09 \$31 \$35 \$35 \$38 \$39 \$37 \$37 \$38 \$00 \$00 \$00 \$00 \$00 \$00 \$00 \$00 \$32 \$35 \$35 \$38 \$39 \$37 \$37 \$37 \$00 \$00 \$00 \$00 \$00 \$00 \$00 \$00 \$33 \$35 \$35 \$38 \$39 \$37 \$37 \$36 \$00 \$00 \$00 \$00 \$00 \$00 \$00 \$00 \$34 \$35 \$35 \$38 \$39 \$37 \$37 \$35 \$00 \$00 \$00 \$00 \$00 \$00 \$00 \$00 \$35 \$35 \$35 \$38 \$39 \$37 \$37 \$34 \$00 \$00 \$00 \$00

	\$00 \$00 \$00 \$00 \$36 \$35 \$35 \$38 \$39 \$37 \$37 \$33 \$00 \$00 \$00 \$00 \$00 \$00 \$00 \$00 \$37 \$35 \$35 \$38 \$39 \$37 \$37 \$32 \$00 \$00 \$00 \$00 \$00 \$00 \$00 \$00 \$38 \$35 \$35 \$38 \$39 \$37 \$37 \$31 \$00 \$00 \$00 \$00 \$00 \$00 \$00 \$00 \$39 \$35 \$35 \$38 \$39 \$37 \$37 \$30 \$00 \$00 \$00 \$00 \$00 \$00 \$00 \$00
15765_11_ECU5_SID\$09_INF\$06_9	\$00 \$00 \$07 \$EC \$49 \$06 \$09 \$57 \$91 \$BC \$88 \$58 \$91 \$BC \$87 \$59 \$91 \$BC \$86 \$5A \$91 \$BC \$85 \$5B \$91 \$BC \$84 \$5C \$91 \$BC \$83 \$5D \$91 \$BC \$82 \$5E \$55 \$AA \$81 \$5F \$FF \$00 \$80
15765_11_ECU5_SID\$09_INF\$0A	\$00 \$00 \$07 \$EC \$49 \$0A \$01 \$45 \$43 \$43 \$32 \$2D \$45 \$6D \$69 \$73 \$43 \$72 \$69 \$74 \$49 \$6E \$66 \$6F \$32 \$00 \$00
15765_11_ECU5_SID\$09_INF\$0D	\$00 \$00 \$07 \$EC \$49 \$0D \$01 \$00 \$00 \$00 \$00 \$56 \$41 \$4C \$44 \$45 \$53 \$4E \$39 \$38 \$37 \$36 \$35 \$35
15765_11_ECU5_SID\$09_INF\$0F	\$00 \$00 \$07 \$EC \$49 \$0F \$01 \$00 \$00 \$00 \$00 \$00 \$00 \$00 \$56 \$41 \$4C \$44 \$45 \$52 \$54 \$41 \$4E \$35
15765_11_ECU6_SID\$09_INF\$00	\$00 \$00 \$07 \$ED \$49 \$00 \$14 \$40 \$00 \$00
15765_11_ECU6_SID\$09_INF\$00_DIESEL	\$00 \$00 \$07 \$ED \$49 \$00 \$14 \$4A \$00 \$00
15765_11_ECU6_SID\$09_INF\$04_9	\$00 \$00 \$07 \$ED \$49 \$04 \$09 \$31 \$36 \$35 \$38 \$39 \$37 \$37 \$38 \$00 \$00 \$00 \$00 \$00 \$00 \$00 \$00 \$32 \$36 \$35 \$38 \$39 \$37 \$37 \$37 \$00 \$00 \$00 \$00 \$00 \$00 \$00 \$00 \$33 \$36 \$35 \$38 \$39 \$37 \$37 \$36 \$00 \$00 \$00 \$00 \$00 \$00 \$00 \$00 \$34 \$36 \$35 \$38 \$39 \$37 \$37 \$35 \$00 \$00 \$00 \$00 \$00 \$00 \$00 \$00 \$35 \$36 \$35 \$38 \$39 \$37 \$37 \$34 \$00 \$00 \$00 \$00 \$00 \$00 \$00 \$00 \$36 \$36 \$35 \$38 \$39 \$37 \$37 \$33 \$00 \$00 \$00 \$00 \$00 \$00 \$00 \$00 \$37 \$36 \$35 \$38 \$39 \$37 \$37 \$32 \$00 \$00 \$00 \$00 \$00 \$00 \$00 \$00 \$38 \$36 \$35 \$38 \$39 \$37 \$37 \$31 \$00 \$00 \$00 \$00 \$00 \$00 \$00 \$00 \$39 \$36 \$35 \$38 \$39 \$37 \$37 \$30 \$00 \$00 \$00 \$00 \$00 \$00 \$00 \$00
15765_11_ECU6_SID\$09_INF\$06_9	\$00 \$00 \$07 \$ED \$49 \$06 \$09 \$67 \$91 \$BC \$88 \$68 \$91 \$BC \$87 \$69 \$91 \$BC \$86 \$6A \$91 \$BC \$85 \$6B \$91 \$BC \$84 \$6C \$91 \$BC \$83 \$6D \$91 \$BC \$82 \$6E \$55 \$AA \$81 \$6F \$FF \$00 \$80
15765_11_ECU6_SID\$09_INF\$0A	\$00 \$00 \$07 \$ED \$49 \$0A \$01 \$54 \$43 \$4D \$32 \$2D \$54 \$72 \$61 \$6E \$73 \$6D \$69 \$73 \$43 \$74 \$72 \$6C \$32 \$00 \$00
15765_11_ECU6_SID\$09_INF\$0D	\$00 \$00 \$07 \$ED \$49 \$0D \$01 \$00 \$00 \$00 \$00 \$56 \$41 \$4C \$44 \$45 \$53 \$4E \$39 \$38 \$37 \$36 \$35 \$36
15765_11_ECU6_SID\$09_INF\$0F	\$00 \$00 \$07 \$ED \$49 \$0F \$01 \$00 \$00 \$00 \$00 \$00 \$00 \$00 \$56 \$41 \$4C \$44 \$45 \$52 \$54 \$41 \$4E \$36
15765_11_ECU7_SID\$09_INF\$00	\$00 \$00 \$07 \$EE \$49 \$00 \$14 \$40 \$00 \$00
15765_11_ECU7_SID\$09_INF\$00_DIESEL	\$00 \$00 \$07 \$EE \$49 \$00 \$14 \$4A \$00 \$00
15765_11_ECU7_SID\$09_INF\$04_9	\$00 \$00 \$07 \$EE \$49 \$04 \$09 \$31 \$37 \$35 \$38 \$39 \$37 \$37 \$38 \$00 \$00 \$00 \$00 \$00 \$00 \$00 \$00 \$32 \$37 \$35 \$38 \$39 \$37 \$37 \$37 \$00 \$00 \$00 \$00 \$00 \$00 \$00 \$00 \$33 \$37 \$35 \$38 \$39 \$37 \$37 \$36 \$00 \$00 \$00 \$00 \$00 \$00 \$00 \$00 \$34 \$37 \$35 \$38 \$39 \$37 \$37 \$35 \$00 \$00 \$00 \$00 \$00 \$00 \$00 \$00 \$35 \$37 \$35 \$38 \$39 \$37 \$37 \$34 \$00 \$00 \$00 \$00 \$00 \$00 \$00 \$00 \$36 \$37 \$35 \$38 \$39 \$37 \$37 \$33 \$00 \$00 \$00 \$00 \$00 \$00 \$00 \$00 \$37 \$37 \$35 \$38 \$39 \$37 \$37 \$32 \$00 \$00 \$00 \$00 \$00 \$00 \$00 \$00 \$38 \$37 \$35 \$38 \$39 \$37 \$37 \$31 \$00 \$00 \$00 \$00

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15765_11_ECU7_SID\$09_INF\$06_9	\$00 \$00 \$07 \$EE \$49 \$06 \$09 \$77 \$91 \$BC \$88 \$78 \$91 \$BC \$87 \$79 \$91 \$BC \$86 \$7A \$91 \$BC \$85 \$7B \$91 \$BC \$84 \$7C \$91 \$BC \$83 \$7D \$91 \$BC \$82 \$7E \$55 \$AA \$81 \$7F \$FF \$00 \$80
15765_11_ECU7_SID\$09_INF\$0A	\$00 \$00 \$07 \$EE \$49 \$0A \$01 \$54 \$43 \$43 \$31 \$2D \$54 \$72 \$61 \$6E \$73 \$66 \$43 \$61 \$73 \$65 \$43 \$74 \$72 \$6C \$31
15765_11_ECU7_SID\$09_INF\$0D	\$00 \$00 \$07 \$EE \$49 \$0D \$01 \$00 \$00 \$00 \$00 \$56 \$41 \$4C \$44 \$45 \$53 \$4E \$39 \$38 \$37 \$36 \$35 \$37
15765_11_ECU7_SID\$09_INF\$0F	\$00 \$00 \$07 \$EE \$49 \$0F \$01 \$00 \$00 \$00 \$00 \$00 \$00 \$00 \$56 \$41 \$4C \$44 \$45 \$52 \$54 \$41 \$4E \$37
15765_11_ECU8_SID\$09_INF\$00	\$00 \$00 \$07 \$EF \$49 \$00 \$14 \$40 \$00 \$00
15765_11_ECU8_SID\$09_INF\$00_DIESEL	\$00 \$00 \$07 \$EF \$49 \$00 \$14 \$4A \$00 \$00
15765_11_ECU8_SID\$09_INF\$04_9	\$00 \$00 \$07 \$EF \$49 \$04 \$09 \$31 \$38 \$35 \$38 \$39 \$37 \$37 \$38 \$00 \$00 \$00 \$00 \$00 \$00 \$00 \$32 \$38 \$35 \$38 \$39 \$37 \$37 \$00 \$00 \$00 \$00 \$00 \$00 \$00 \$00 \$33 \$38 \$35 \$38 \$39 \$37 \$37 \$36 \$00 \$00 \$00 \$00 \$00 \$00 \$00 \$00 \$34 \$38 \$35 \$38 \$39 \$37 \$37 \$35 \$00 \$00 \$00 \$00 \$00 \$00 \$00 \$00 \$35 \$38 \$35 \$38 \$39 \$37 \$37 \$34 \$00 \$00 \$00 \$00 \$00 \$00 \$00 \$00 \$36 \$38 \$35 \$38 \$39 \$37 \$37 \$33 \$00 \$00 \$00 \$00 \$00 \$00 \$00 \$00 \$37 \$38 \$35 \$38 \$39 \$37 \$37 \$32 \$00 \$00 \$00 \$00 \$00 \$00 \$00 \$00 \$38 \$38 \$35 \$38 \$39 \$37 \$37 \$31 \$00 \$00 \$00 \$00 \$00 \$00 \$00 \$00 \$39 \$38 \$35 \$38 \$39 \$37 \$37 \$30 \$00 \$00 \$00 \$00 \$00 \$00 \$00 \$00
15765_11_ECU8_SID\$09_INF\$06_9	\$00 \$00 \$07 \$EF \$49 \$06 \$09 \$87 \$91 \$BC \$88 \$88 \$91 \$BC \$87 \$89 \$91 \$BC \$86 \$8A \$91 \$BC \$85 \$8B \$91 \$BC \$84 \$8C \$91 \$BC \$83 \$8D \$91 \$BC \$82 \$8E \$55 \$AA \$81 \$8F \$FF \$00 \$80
15765_11_ECU7_SID\$09_INF\$0A	\$00 \$00 \$07 \$EF \$49 \$0A \$01 \$54 \$43 \$43 \$32 \$2D \$54 \$72 \$61 \$6E \$73 \$66 \$43 \$61 \$73 \$65 \$43 \$74 \$72 \$6C \$32
15765_11_ECU8_SID\$09_INF\$0D	\$00 \$00 \$07 \$EF \$49 \$0D \$01 \$00 \$00 \$00 \$00 \$56 \$41 \$4C \$44 \$45 \$53 \$4E \$39 \$38 \$37 \$36 \$35 \$38
15765_11_ECU8_SID\$09_INF\$0F	\$00 \$00 \$07 \$EF \$49 \$0F \$01 \$00 \$00 \$00 \$00 \$00 \$00 \$00 \$56 \$41 \$4C \$44 \$45 \$52 \$54 \$41 \$4E \$38
15765_11_SID\$0A	\$00 \$00 \$07 \$DF \$0A
15765_11_ECU1_SID\$0A_NoDTC	\$00 \$00 \$07 \$E8 \$4A \$00
15765_11_ECU1_SID\$0A_DTC	\$00 \$00 \$07 \$E8 \$4A \$04 \$01 \$07 \$01 \$10 \$01 \$15 \$01 \$24
15765_11_ECU2_SID\$0A_NoDTC	\$00 \$00 \$07 \$E9 \$4A \$00

The first four bytes are the CAN ID bits 28-24 first, followed by CAN ID bits 23-16, CAN ID bits 15-8, CAN ID bits 7-0.

Figure 7 - Pre-defined messages for ISO 15765-4 (11-bit)

The following messages have been pre-defined for 29-bit ISO 15765-4:

Message Reference	Message Bytes
15765 29 SID\$01 PID\$00	\$18 \$DB \$33 \$F1 \$01 \$00
15765 29 SID\$01 PID\$00-\$E0	\$18 \$DB \$33 \$F1 \$01 \$00 \$20 \$40 \$60 \$80 \$A0 \$C0 \$E0
15765 29 SID\$01 PID\$00	\$18 \$DB \$33 \$F1 \$01 \$00
15765 29 SID\$01 PID\$01	\$18 \$DB \$33 \$F1 \$01 \$01
15765 29 SID\$01 PID\$0C	\$18 \$DB \$33 \$F1 \$01 \$0C
15765 29 SID\$01 PID\$20	\$18 \$DB \$33 \$F1 \$01 \$20
15765 29 SID\$01 PID\$40	\$18 \$DB \$33 \$F1 \$01 \$40
15765 29 SID\$01 PID\$41	\$18 \$DB \$33 \$F1 \$01 \$41
15765 29 SID\$01 PID\$01-\$0C-\$41	\$18 \$DB \$33 \$F1 \$01 \$01 \$0C \$41
15765 29 ECU1 SID\$01 PID\$00	\$18 \$DA \$F1 \$10 \$41 \$00 \$80 \$10 \$00 \$00
15765 29 ECU1 SID\$01 PID\$00 20	\$18 \$DA \$F1 \$10 \$41 \$00 \$80 \$10 \$00 \$01
15765 29 ECU1 SID\$01 PID\$00-\$0E	\$18 \$DA \$F1 \$10 \$41 \$00 \$80 \$00 \$00 \$00 \$20 \$00 \$00 \$00 \$01 \$40 \$10 \$00 \$00 \$00
15765 29 ECU1 SID\$01 PID\$01	\$18 \$DA \$F1 \$10 \$41 \$01 \$00 \$07 \$EF \$EF
15765 29 ECU1 SID\$01 PID\$01 SPARK	\$18 \$DA \$F1 \$10 \$41 \$01 \$00 \$07 \$EF \$EF
15765 29 ECU1 SID\$01 PID\$01 COMP	\$18 \$DA \$F1 \$10 \$41 \$01 \$00 \$0F \$EB \$EB
15765 29 ECU1 SID\$01 PID\$0C KOEO	\$18 \$DA \$F1 \$10 \$41 \$0C \$00 \$00
15765 29 ECU1 SID\$01 PID\$20	\$18 \$DA \$F1 \$10 \$41 \$20 \$00 \$00 \$00 \$01
15765 29 ECU1 SID\$01 PID\$40	\$18 \$DA \$F1 \$10 \$41 \$40 \$10 \$00 \$00 \$00
15765 29 ECU1 SID\$01 PID\$41 SPARK	\$18 \$DA \$F1 \$10 \$41 \$41 \$00 \$07 \$EF \$EF
15765 29 ECU1 SID\$01 PID\$01-\$0C-\$41	\$18 \$DA \$F1 \$10 \$41 \$01 \$00 \$07 \$EF \$EF \$0C \$00 \$00 \$41 \$00 \$07 \$EF \$EF
15765 29 ECU1 SID\$01 NRC\$21	\$18 \$DA \$F1 \$10 \$7F \$01 \$21
15765 29 ECU2 SID\$01 PID\$00	\$18 \$DA \$F1 \$11 \$41 \$00 \$80 \$00 \$00 \$00
15765 29 ECU2 SID\$01 PID\$01 SPARK	\$18 \$DA \$F1 \$11 \$41 \$01 \$81 \$44 \$00 \$00
15765 29 ECU2 SID\$01 PID\$01 COMP	\$18 \$DA \$F1 \$11 \$41 \$01 \$81 \$4C \$00 \$00
15765 29 ECU2 SID\$01 PID\$0C KOEO	\$18 \$DA \$F1 \$11 \$41 \$0C \$00 \$00
15765 29 ECU3 SID\$01 PID\$00	\$18 \$DA \$F1 \$12 \$41 \$00 \$00 \$00 \$00 \$00
15765 29 ECU4 SID\$01 PID\$00	\$18 \$DA \$F1 \$13 \$41 \$00 \$00 \$00 \$00 \$00
15765 29 ECU5 SID\$01 PID\$00	\$18 \$DA \$F1 \$14 \$41 \$00 \$00 \$00 \$00 \$00
15765 29 ECU6 SID\$01 PID\$00	\$18 \$DA \$F1 \$15 \$41 \$00 \$00 \$00 \$00 \$00
15765 29 ECU7 SID\$01 PID\$00	\$18 \$DA \$F1 \$16 \$41 \$00 \$00 \$00 \$00 \$00
15765 29 ECU8 SID\$01 PID\$00	\$18 \$DA \$F1 \$17 \$41 \$00 \$00 \$00 \$00 \$00
15765 29 SID\$02 PID\$02	\$18 \$DB \$33 \$F1 \$02 \$02 \$00
15765 29 ECU1 SID\$02 PID\$02 NoDTC	\$18 \$DA \$F1 \$10 \$42 \$02 \$00 \$00 \$00
15765 29 ECU2 SID\$02 PID\$02 NoDTC	\$18 \$DA \$F1 \$11 \$42 \$02 \$00 \$00 \$00
15765 29 ECU1 SID\$02 PID\$02 DTC	\$18 \$DA \$F1 \$10 \$42 \$02 \$00 \$01 \$07
15765 29 SID\$03	\$18 \$DB \$33 \$F1 \$03
15765 29 ECU1 SID\$03 NoDTC	\$18 \$DA \$F1 \$10 \$43 \$00
15765 29 ECU1 SID\$03 DTC	\$18 \$DA \$F1 \$10 \$43 \$04 \$01 \$07 \$01 \$10 \$01 \$15 \$01 \$24
15765 29 ECU2 SID\$03 NoDTC	\$18 \$DA \$F1 \$11 \$43 \$00
15765 29 SID\$04	\$18 \$DB \$33 \$F1 \$04
15765 29 ECU1 SID\$04 DONE	\$18 \$DA \$F1 \$10 \$44
15765 29 ECU1 SID\$04 NRC22	\$18 \$DA \$F1 \$10 \$7F \$44 \$22
15765 29 ECU1 SID\$04 NRC78	\$18 \$DA \$F1 \$10 \$7F \$44 \$78
15765 29 ECU2 SID\$04 DONE	\$18 \$DA \$F1 \$11 \$44
15765 29 ECU2 SID\$04 NRC22	\$18 \$DA \$F1 \$11 \$7F \$44 \$22
15765 29 SID\$06 MID\$00	\$18 \$DB \$33 \$F1 \$06 \$00
15765 29 ECU1 SID\$06 MID\$00	\$18 \$DA \$F1 \$10 \$46 \$00 \$CC \$00 \$00 \$00
15765 29 SID\$07	\$18 \$DB \$33 \$F1 \$07
15765 29 ECU1 SID\$07 NoDTC	\$18 \$DA \$F1 \$10 \$47 \$00
15765 29 ECU1 SID\$07 DTC	\$18 \$DA \$F1 \$10 \$47 \$04 \$01 \$07 \$01 \$10 \$01 \$15 \$01 \$24

15765 29 ECU2_SID\$07_NoDTC	\$18 \$DA \$F1 \$11 \$47 \$00
15765 29_SID\$08_TID\$00	\$18 \$DB \$33 \$F1 \$08
15765 29 ECU1_SID\$08_TID\$00	\$18 \$DA \$F1 \$10 \$48 \$00 \$80 \$00 \$00 \$00
15765 29_SID\$09_INF\$00	\$18 \$DB \$33 \$F1 \$09 \$00
15765 29_SID\$09_INF\$02	\$18 \$DB \$33 \$F1 \$09 \$02
15765 29_SID\$09_INF\$04	\$18 \$DB \$33 \$F1 \$09 \$04
15765 29_SID\$09_INF\$06	\$18 \$DB \$33 \$F1 \$09 \$06
15765 29_SID\$09_INF\$08	\$18 \$DB \$33 \$F1 \$09 \$08
15765 29_SID\$09_INF\$0A	\$18 \$DB \$33 \$F1 \$09 \$0A
15765 29_SID\$09_INF\$0B	\$18 \$DB \$33 \$F1 \$09 \$0B
15765 29_SID\$09_INF\$0D	\$18 \$DB \$33 \$F1 \$09 \$0D
15765 29_SID\$09_INF\$0F	\$18 \$DB \$33 \$F1 \$09 \$0F
15765 29 ECU1_SID\$09_INF\$00	\$18 \$DA \$F1 \$10 \$49 \$00 \$55 \$40 \$00 \$00
15765 29 ECU1_SID\$09_INF\$00_DIESEL	\$18 \$DA \$F1 \$10 \$49 \$00 \$54 \$6A \$00 \$00
15765_29_ECU1_SID\$09_INF\$02	\$18 \$DA \$F1 \$10 \$49 \$02 \$01 \$31 \$47 \$59 \$44 \$45 \$36 \$33 \$41 \$37 \$41 \$30 \$30 \$30 \$30 \$30
15765_29_ECU1_SID\$09_INF\$04	\$18 \$DA \$F1 \$10 \$49 \$04 \$01 \$31 \$32 \$35 \$38 \$39 \$37 \$37 \$32 \$00 \$00 \$00 \$00 \$00 \$00 \$00
15765_29_ECU1_SID\$09_INF\$04_9	\$18 \$DA \$F1 \$10 \$49 \$04 \$09 \$31 \$31 \$35 \$38 \$39 \$37 \$37 \$38 \$00 \$00 \$00 \$00 \$00 \$00 \$00 \$32 \$31 \$35 \$38 \$39 \$37 \$37 \$37 \$00 \$00 \$00 \$00 \$00 \$00 \$00 \$00 \$33 \$31 \$35 \$38 \$39 \$37 \$37 \$36 \$00 \$00 \$00 \$00 \$00 \$00 \$00 \$00 \$34 \$31 \$35 \$38 \$39 \$37 \$37 \$35 \$00 \$00 \$00 \$00 \$00 \$00 \$00 \$00 \$35 \$31 \$35 \$38 \$39 \$37 \$37 \$34 \$00 \$00 \$00 \$00 \$00 \$00 \$00 \$00 \$36 \$31 \$35 \$38 \$39 \$37 \$37 \$33 \$00 \$00 \$00 \$00 \$00 \$00 \$00 \$00 \$37 \$31 \$35 \$38 \$39 \$37 \$37 \$32 \$00 \$00 \$00 \$00 \$00 \$00 \$00 \$00 \$38 \$31 \$35 \$38 \$39 \$37 \$37 \$31 \$00 \$00 \$00 \$00 \$00 \$00 \$00 \$00 \$39 \$31 \$35 \$38 \$39 \$37 \$37 \$30 \$00 \$00 \$00 \$00 \$00 \$00 \$00 \$00
15765 29 ECU1_SID\$09_INF\$06	\$18 \$DA \$F1 \$10 \$49 \$06 \$01 \$17 \$91 \$BC \$88
15765_29_ECU1_SID\$09_INF\$06_9	\$18 \$DA \$F1 \$10 \$49 \$06 \$09 \$17 \$91 \$BC \$88 \$18 \$91 \$BC \$87 \$19 \$91 \$BC \$86 \$1A \$91 \$BC \$85 \$1B \$91 \$BC \$84 \$1C \$91 \$BC \$83 \$1D \$91 \$BC \$82 \$1E \$55 \$AA \$81 \$1F \$FF \$00 \$80
15765_29_ECU1_SID\$09_INF\$08_32	\$18 \$DA \$F1 \$10 \$49 \$08 \$10 \$00 \$64 \$00 \$69 \$00 \$0A \$00 \$0F \$00 \$00 \$00 \$00 \$00 \$1E \$00 \$23 \$00 \$00 \$00 \$00 \$00 \$32 \$00 \$37 \$00 \$3C \$00 \$41 \$00 \$46 \$00 \$4B
15765_29_ECU1_SID\$09_INF\$08_40	\$18 \$DA \$F1 \$10 \$49 \$08 \$14 \$00 \$64 \$00 \$69 \$00 \$0A \$00 \$0F \$00 \$00 \$00 \$00 \$00 \$1E \$00 \$23 \$00 \$00 \$00 \$00 \$00 \$32 \$00 \$37 \$00 \$3C \$00 \$41 \$00 \$46 \$00 \$4B \$00 \$5A \$00 \$5F \$00 \$00 \$00 \$00
15765_29_ECU1_SID\$09_INF\$0A	\$18 \$DA \$F1 \$10 \$49 \$0A \$01 \$45 \$43 \$4D \$31 \$2D \$45 \$6E \$67 \$69 \$6E \$65 \$43 \$6F \$6E \$74 \$72 \$6F \$6C \$31 \$00
15765_29_ECU1_SID\$09_INF\$0B_32	\$18 \$DA \$F1 \$10 \$49 \$0B \$10 \$00 \$64 \$00 \$69 \$00 \$0A \$00 \$0F \$00 \$00 \$00 \$00 \$00 \$00 \$00 \$00 \$00 \$00 \$00 \$00 \$32 \$00 \$37 \$00 \$3C \$00 \$41 \$00 \$46 \$00 \$4B
15765_29_ECU1_SID\$09_INF\$0B_36	\$18 \$DA \$F1 \$10 \$49 \$0B \$12 \$00 \$64 \$00 \$69 \$00 \$0A \$00 \$0F \$00 \$00 \$00 \$00 \$00 \$00 \$00 \$00 \$00 \$00 \$00 \$00 \$32 \$00 \$37 \$00 \$3C \$00 \$41 \$00 \$46 \$00 \$4B \$00 \$50 \$00 \$55
15765_29_ECU1_SID\$09_INF\$0D	\$18 \$DA \$F1 \$10 \$49 \$0D \$01 \$00 \$00 \$00 \$00 \$56 \$41 \$4C \$44 \$45 \$53 \$4E \$39 \$38 \$37 \$36 \$35 \$31

15765_29_ECU1_SID\$09_INF\$0F	\$18 \$DA \$F1 \$10 \$49 \$0F \$01 \$00 \$00 \$00 \$00 \$00 \$00 \$00 \$56 \$41 \$4C \$44 \$45 \$52 \$54 \$41 \$4E \$31
15765_29_ECU1_SID\$09_NRC78	\$18 \$DA \$F1 \$10 \$7F \$49 \$78
15765_29_ECU2_SID\$09_INF\$00	\$18 \$DA \$F1 \$11 \$49 \$00 \$15 \$40 \$00 \$00
15765_29_ECU2_SID\$09_INF\$00_DIESEL	\$18 \$DA \$F1 \$11 \$49 \$00 \$14 \$6A \$00 \$00
15765_29_ECU2_SID\$09_INF\$04	\$18 \$DA \$F1 \$11 \$49 \$04 \$01 \$32 \$34 \$32 \$32 \$31 \$34 \$31 \$39 \$00 \$00 \$00 \$00 \$00 \$00 \$00
15765_29_ECU2_SID\$09_INF\$04_9	\$18 \$DA \$F1 \$11 \$49 \$04 \$09 \$31 \$32 \$35 \$38 \$39 \$37 \$37 \$38 \$00 \$00 \$00 \$00 \$00 \$00 \$00 \$32 \$32 \$35 \$38 \$39 \$37 \$37 \$37 \$00 \$00 \$00 \$00 \$00 \$00 \$00 \$00 \$33 \$32 \$35 \$38 \$39 \$37 \$37 \$36 \$00 \$00 \$00 \$00 \$00 \$00 \$00 \$00 \$34 \$32 \$35 \$38 \$39 \$37 \$37 \$35 \$00 \$00 \$00 \$00 \$00 \$00 \$00 \$00 \$35 \$32 \$35 \$38 \$39 \$37 \$37 \$34 \$00 \$00 \$00 \$00 \$00 \$00 \$00 \$00 \$36 \$32 \$35 \$38 \$39 \$37 \$37 \$33 \$00 \$00 \$00 \$00 \$00 \$00 \$00 \$00 \$37 \$32 \$35 \$38 \$39 \$37 \$37 \$32 \$00 \$00 \$00 \$00 \$00 \$00 \$00 \$00 \$38 \$32 \$35 \$38 \$39 \$37 \$37 \$31 \$00 \$00 \$00 \$00 \$00 \$00 \$00 \$00 \$39 \$32 \$35 \$38 \$39 \$37 \$37 \$30 \$00 \$00 \$00 \$00 \$00 \$00 \$00 \$00
15765_29_ECU2_SID\$09_INF\$06	\$18 \$DA \$F1 \$11 \$49 \$06 \$02 \$27 \$91 \$BC \$88
15765_29_ECU2_SID\$09_INF\$06_9	\$18 \$DA \$F1 \$11 \$49 \$06 \$09 \$27 \$91 \$BC \$88 \$28 \$91 \$BC \$87 \$29 \$91 \$BC \$86 \$2A \$91 \$BC \$85 \$2B \$91 \$BC \$84 \$2C \$91 \$BC \$83 \$2D \$91 \$BC \$82 \$2E \$55 \$AA \$81 \$2F \$FF \$00 \$80
15765_29_ECU2_SID\$09_INF\$08_32	\$18 \$DA \$F1 \$11 \$49 \$08 \$10 \$00 \$64 \$00 \$69 \$00 \$00 \$00 \$00 \$00 \$14 \$00 \$19 \$00 \$00 \$00 \$00 \$00 \$28 \$00 \$2D \$00 \$00 \$00 \$00 \$00 \$00 \$00 \$00 \$00 \$00 \$00 \$00
15765_29_ECU2_SID\$09_INF\$08_40	\$18 \$DA \$F1 \$11 \$49 \$08 \$14 \$00 \$64 \$00 \$69 \$00 \$00 \$00 \$00 \$00 \$14 \$00 \$19 \$00 \$00 \$00 \$00 \$00 \$28 \$00 \$2D \$00 \$00 \$00 \$00 \$00 \$00 \$00 \$00 \$00 \$00 \$00 \$00 \$00 \$00 \$00 \$00 \$5A \$00 \$5F
15765_29_ECU2_SID\$09_INF\$0A	\$18 \$DA \$F1 \$11 \$49 \$0A \$01 \$45 \$43 \$4D \$32 \$2D \$45 \$6E \$67 \$69 \$6E \$65 \$43 \$6F \$6E \$74 \$72 \$6F \$6C \$32 \$00
15765_29_ECU2_SID\$09_INF\$0B_32	\$18 \$DA \$F1 \$11 \$49 \$0B \$10 \$00 \$64 \$00 \$69 \$00 \$00 \$00 \$00 \$00 \$14 \$00 \$19 \$00 \$00 \$00 \$00 \$00 \$28 \$00 \$2D \$00 \$00 \$00 \$00 \$00 \$00 \$00 \$00 \$00 \$00 \$00 \$00
15765_29_ECU2_SID\$09_INF\$0B_36	\$18 \$DA \$F1 \$11 \$49 \$0B \$12 \$00 \$64 \$00 \$69 \$00 \$00 \$00 \$00 \$00 \$14 \$00 \$19 \$00 \$00 \$00 \$00 \$00 \$28 \$00 \$2D \$00 \$00 \$00 \$00 \$00 \$00 \$00 \$00 \$00 \$00 \$00 \$00 \$00 \$00 \$00 \$00
15765_29_ECU2_SID\$09_INF\$0D	\$18 \$DA \$F1 \$11 \$49 \$0D \$01 \$00 \$00 \$00 \$00 \$56 \$41 \$4C \$44 \$45 \$53 \$4E \$39 \$38 \$37 \$36 \$35 \$32
15765_29_ECU2_SID\$09_INF\$0F	\$18 \$DA \$F1 \$11 \$49 \$0F \$01 \$00 \$00 \$00 \$00 \$00 \$00 \$00 \$56 \$41 \$4C \$44 \$45 \$52 \$54 \$41 \$4E \$32
15765_29_ECU3_SID\$09_INF\$00	\$18 \$DA \$F1 \$12 \$49 \$00 \$14 \$40 \$00 \$00
15765_29_ECU3_SID\$09_INF\$00_DIESEL	\$18 \$DA \$F1 \$12 \$49 \$00 \$14 \$4A \$00 \$00
15765_29_ECU3_SID\$09_INF\$04_9	\$18 \$DA \$F1 \$12 \$49 \$04 \$09 \$31 \$33 \$35 \$38 \$39 \$37 \$37 \$38 \$00 \$00 \$00 \$00 \$00 \$00 \$00 \$32 \$33 \$35 \$38 \$39 \$37 \$37 \$37 \$00 \$00 \$00 \$00 \$00 \$00 \$00 \$00 \$33 \$33 \$35 \$38 \$39 \$37 \$37 \$36 \$00 \$00 \$00 \$00 \$00 \$00 \$00 \$00 \$34 \$33 \$35 \$38 \$39 \$37 \$37 \$35 \$00 \$00 \$00 \$00 \$00 \$00 \$00 \$00 \$35 \$33 \$35 \$38 \$39 \$37 \$37 \$34 \$00 \$00 \$00 \$00

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15765_29_ECU3_SID\$09_INF\$06_9	\$18 \$DA \$F1 \$12 \$49 \$06 \$09 \$37 \$91 \$BC \$88 \$38 \$91 \$BC \$87 \$39 \$91 \$BC \$86 \$3A \$91 \$BC \$85 \$3B \$91 \$BC \$84 \$3C \$91 \$BC \$83 \$3D \$91 \$BC \$82 \$3E \$55 \$AA \$81 \$3F \$FF \$00 \$80
15765_29_ECU3_SID\$09_INF\$0A	\$18 \$DA \$F1 \$12 \$49 \$0A \$01 \$54 \$43 \$4D \$31 \$2D \$54 \$72 \$61 \$6E \$73 \$6D \$69 \$73 \$43 \$74 \$72 \$6C \$31 \$00 \$00
15765_29_ECU3_SID\$09_INF\$0D	\$18 \$DA \$F1 \$12 \$49 \$0D \$01 \$00 \$00 \$00 \$00 \$56 \$41 \$4C \$44 \$45 \$53 \$4E \$39 \$38 \$37 \$36 \$35 \$33
15765_29_ECU3_SID\$09_INF\$0F	\$18 \$DA \$F1 \$12 \$49 \$0F \$01 \$00 \$00 \$00 \$00 \$00 \$00 \$00 \$56 \$41 \$4C \$44 \$45 \$52 \$54 \$41 \$4E \$33
15765_29_ECU4_SID\$09_INF\$00	\$18 \$DA \$F1 \$13 \$49 \$00 \$14 \$40 \$00 \$00
15765_29_ECU4_SID\$09_INF\$00_DIESEL	\$18 \$DA \$F1 \$13 \$49 \$00 \$14 \$4A \$00 \$00
15765_29_ECU4_SID\$09_INF\$04_9	\$18 \$DA \$F1 \$13 \$49 \$04 \$09 \$31 \$34 \$35 \$38 \$39 \$37 \$37 \$38 \$00 \$00 \$00 \$00 \$00 \$00 \$00 \$00 \$32 \$34 \$35 \$38 \$39 \$37 \$37 \$37 \$00 \$00 \$00 \$00 \$00 \$00 \$00 \$00 \$33 \$34 \$35 \$38 \$39 \$37 \$37 \$36 \$00 \$00 \$00 \$00 \$00 \$00 \$00 \$00 \$34 \$34 \$35 \$38 \$39 \$37 \$37 \$35 \$00 \$00 \$00 \$00 \$00 \$00 \$00 \$00 \$35 \$34 \$35 \$38 \$39 \$37 \$37 \$34 \$00 \$00 \$00 \$00 \$00 \$00 \$00 \$00 \$36 \$34 \$35 \$38 \$39 \$37 \$37 \$33 \$00 \$00 \$00 \$00 \$00 \$00 \$00 \$00 \$37 \$34 \$35 \$38 \$39 \$37 \$37 \$32 \$00 \$00 \$00 \$00 \$00 \$00 \$00 \$00 \$38 \$34 \$35 \$38 \$39 \$37 \$37 \$31 \$00 \$00 \$00 \$00 \$00 \$00 \$00 \$00 \$39 \$34 \$35 \$38 \$39 \$37 \$37 \$30 \$00 \$00 \$00 \$00 \$00 \$00 \$00 \$00
15765_29_ECU4_SID\$09_INF\$06_9	\$18 \$DA \$F1 \$13 \$49 \$06 \$09 \$47 \$91 \$BC \$88 \$48 \$91 \$BC \$87 \$49 \$91 \$BC \$86 \$4A \$91 \$BC \$85 \$4B \$91 \$BC \$84 \$4C \$91 \$BC \$83 \$4D \$91 \$BC \$82 \$4E \$55 \$AA \$81 \$4F \$FF \$00 \$80
15765_29_ECU4_SID\$09_INF\$0A	\$18 \$DA \$F1 \$13 \$49 \$0A \$01 \$45 \$43 \$43 \$31 \$2D \$45 \$6D \$69 \$73 \$43 \$72 \$69 \$74 \$49 \$6E \$66 \$6F \$31 \$00 \$00
15765_29_ECU4_SID\$09_INF\$0D	\$18 \$DA \$F1 \$13 \$49 \$0D \$01 \$00 \$00 \$00 \$00 \$56 \$41 \$4C \$44 \$45 \$53 \$4E \$39 \$38 \$37 \$36 \$35 \$34
15765_29_ECU4_SID\$09_INF\$0F	\$18 \$DA \$F1 \$13 \$49 \$0F \$01 \$00 \$00 \$00 \$00 \$00 \$00 \$00 \$56 \$41 \$4C \$44 \$45 \$52 \$54 \$41 \$4E \$34
15765_29_ECU5_SID\$09_INF\$00	\$18 \$DA \$F1 \$14 \$49 \$00 \$14 \$40 \$00 \$00
15765_29_ECU5_SID\$09_INF\$00_DIESEL	\$18 \$DA \$F1 \$14 \$49 \$00 \$14 \$4A \$00 \$00
15765_29_ECU5_SID\$09_INF\$04_9	\$18 \$DA \$F1 \$14 \$49 \$04 \$09 \$31 \$35 \$35 \$38 \$39 \$37 \$37 \$38 \$00 \$00 \$00 \$00 \$00 \$00 \$00 \$00 \$32 \$35 \$35 \$38 \$39 \$37 \$37 \$37 \$00 \$00 \$00 \$00 \$00 \$00 \$00 \$00 \$33 \$35 \$35 \$38 \$39 \$37 \$37 \$36 \$00 \$00 \$00 \$00 \$00 \$00 \$00 \$00 \$34 \$35 \$35 \$38 \$39 \$37 \$37 \$35 \$00 \$00 \$00 \$00 \$00 \$00 \$00 \$00 \$35 \$35 \$35 \$38 \$39 \$37 \$37 \$34 \$00 \$00 \$00 \$00 \$00 \$00 \$00 \$00 \$36 \$35 \$35 \$38 \$39 \$37 \$37 \$33 \$00 \$00 \$00 \$00 \$00 \$00 \$00 \$00 \$37 \$35 \$35 \$38 \$39 \$37 \$37 \$32 \$00 \$00 \$00 \$00 \$00 \$00 \$00 \$00 \$38 \$35 \$35 \$38 \$39 \$37 \$37 \$31 \$00 \$00 \$00 \$00

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15765_29_ECU5_SID\$09_INF\$06_9	\$18 \$DA \$F1 \$14 \$49 \$06 \$09 \$57 \$91 \$BC \$88 \$58 \$91 \$BC \$87 \$59 \$91 \$BC \$86 \$5A \$91 \$BC \$85 \$5B \$91 \$BC \$84 \$5C \$91 \$BC \$83 \$5D \$91 \$BC \$82 \$5E \$55 \$AA \$81 \$5F \$FF \$00 \$80
15765_29_ECU5_SID\$09_INF\$0A	\$18 \$DA \$F1 \$14 \$49 \$0A \$01 \$45 \$43 \$43 \$32 \$2D \$45 \$6D \$69 \$73 \$43 \$72 \$69 \$74 \$49 \$6E \$66 \$6F \$32 \$00 \$00
15765_29_ECU5_SID\$09_INF\$0D	\$18 \$DA \$F1 \$14 \$49 \$0D \$01 \$00 \$00 \$00 \$00 \$56 \$41 \$4C \$44 \$45 \$53 \$4E \$39 \$38 \$37 \$36 \$35 \$35
15765_29_ECU5_SID\$09_INF\$0F	\$18 \$DA \$F1 \$14 \$49 \$0F \$01 \$00 \$00 \$00 \$00 \$00 \$00 \$00 \$56 \$41 \$4C \$44 \$45 \$52 \$54 \$41 \$4E \$35
15765_29_ECU6_SID\$09_INF\$00	\$18 \$DA \$F1 \$15 \$49 \$00 \$14 \$40 \$00 \$00
15765_29_ECU6_SID\$09_INF\$00_DIESEL	\$18 \$DA \$F1 \$15 \$49 \$00 \$14 \$4A \$00 \$00
15765_29_ECU6_SID\$09_INF\$04_9	\$18 \$DA \$F1 \$15 \$49 \$04 \$09 \$31 \$36 \$35 \$38 \$39 \$37 \$37 \$38 \$00 \$00 \$00 \$00 \$00 \$00 \$00 \$32 \$36 \$35 \$38 \$39 \$37 \$37 \$37 \$00 \$00 \$00 \$00 \$00 \$00 \$00 \$00 \$33 \$36 \$35 \$38 \$39 \$37 \$37 \$36 \$00 \$00 \$00 \$00 \$00 \$00 \$00 \$00 \$34 \$36 \$35 \$38 \$39 \$37 \$37 \$35 \$00 \$00 \$00 \$00 \$00 \$00 \$00 \$00 \$35 \$36 \$35 \$38 \$39 \$37 \$37 \$34 \$00 \$00 \$00 \$00 \$00 \$00 \$00 \$00 \$36 \$36 \$35 \$38 \$39 \$37 \$37 \$33 \$00 \$00 \$00 \$00 \$00 \$00 \$00 \$00 \$37 \$36 \$35 \$38 \$39 \$37 \$37 \$32 \$00 \$00 \$00 \$00 \$00 \$00 \$00 \$00 \$38 \$36 \$35 \$38 \$39 \$37 \$37 \$31 \$00 \$00 \$00 \$00 \$00 \$00 \$00 \$00 \$39 \$36 \$35 \$38 \$39 \$37 \$37 \$30 \$00 \$00 \$00 \$00 \$00 \$00 \$00 \$00
15765_29_ECU6_SID\$09_INF\$06_9	\$18 \$DA \$F1 \$15 \$49 \$06 \$09 \$67 \$91 \$BC \$88 \$68 \$91 \$BC \$87 \$69 \$91 \$BC \$86 \$6A \$91 \$BC \$85 \$6B \$91 \$BC \$84 \$6C \$91 \$BC \$83 \$6D \$91 \$BC \$82 \$6E \$55 \$AA \$81 \$6F \$FF \$00 \$80
15765_29_ECU6_SID\$09_INF\$0A	\$18 \$DA \$F1 \$15 \$49 \$0A \$01 \$54 \$43 \$4D \$32 \$2D \$54 \$72 \$61 \$6E \$73 \$6D \$69 \$73 \$43 \$74 \$72 \$6C \$32 \$00 \$00
15765_29_ECU6_SID\$09_INF\$0D	\$18 \$DA \$F1 \$15 \$49 \$0D \$01 \$00 \$00 \$00 \$00 \$56 \$41 \$4C \$44 \$45 \$53 \$4E \$39 \$38 \$37 \$36 \$35 \$36
15765_29_ECU6_SID\$09_INF\$0F	\$18 \$DA \$F1 \$15 \$49 \$0F \$01 \$00 \$00 \$00 \$00 \$00 \$00 \$00 \$56 \$41 \$4C \$44 \$45 \$52 \$54 \$41 \$4E \$36
15765_29_ECU7_SID\$09_INF\$00	\$18 \$DA \$F1 \$16 \$49 \$00 \$14 \$40 \$00 \$00
15765_29_ECU7_SID\$09_INF\$00_DIESEL	\$18 \$DA \$F1 \$16 \$49 \$00 \$14 \$4A \$00 \$00
15765_29_ECU7_SID\$09_INF\$04_9	\$18 \$DA \$F1 \$16 \$49 \$04 \$09 \$31 \$37 \$35 \$38 \$39 \$37 \$37 \$38 \$00 \$00 \$00 \$00 \$00 \$00 \$00 \$32 \$37 \$35 \$38 \$39 \$37 \$37 \$37 \$00 \$00 \$00 \$00 \$00 \$00 \$00 \$00 \$33 \$37 \$35 \$38 \$39 \$37 \$37 \$36 \$00 \$00 \$00 \$00 \$00 \$00 \$00 \$00 \$34 \$37 \$35 \$38 \$39 \$37 \$37 \$35 \$00 \$00 \$00 \$00 \$00 \$00 \$00 \$00 \$35 \$37 \$35 \$38 \$39 \$37 \$37 \$34 \$00 \$00 \$00 \$00 \$00 \$00 \$00 \$00 \$36 \$37 \$35 \$38 \$39 \$37 \$37 \$33 \$00 \$00 \$00 \$00 \$00 \$00 \$00 \$00 \$37 \$37 \$35 \$38 \$39 \$37 \$37 \$32 \$00 \$00 \$00 \$00 \$00 \$00 \$00 \$00 \$38 \$37 \$35 \$38 \$39 \$37 \$37 \$31 \$00 \$00 \$00 \$00 \$00 \$00 \$00 \$00 \$39 \$37 \$35 \$38 \$39 \$37 \$37 \$30 \$00 \$00 \$00 \$00 \$00 \$00 \$00 \$00
15765_29_ECU7_SID\$09_INF\$06_9	\$18 \$DA \$F1 \$16 \$49 \$06 \$09 \$77 \$91 \$BC \$88 \$78 \$91 \$BC \$87 \$79 \$91 \$BC \$86 \$7A \$91 \$BC

	\$85 \$7B \$91 \$BC \$84 \$7C \$91 \$BC \$83 \$7D \$91 \$BC \$82 \$7E \$55 \$AA \$81 \$7F \$FF \$00 \$80
15765_29_ECU7_SID\$09_INF\$0A	\$18 \$DA \$F1 \$16 \$49 \$0A \$01 \$54 \$43 \$43 \$31 \$2D \$54 \$72 \$61 \$6E \$73 \$66 \$43 \$61 \$73 \$65 \$43 \$74 \$72 \$6C \$31
15765_29_ECU7_SID\$09_INF\$0D	\$18 \$DA \$F1 \$16 \$49 \$0D \$01 \$00 \$00 \$00 \$00 \$56 \$41 \$4C \$44 \$45 \$53 \$4E \$39 \$38 \$37 \$36 \$35 \$37
15765_29_ECU7_SID\$09_INF\$0F	\$18 \$DA \$F1 \$16 \$49 \$0F \$01 \$00 \$00 \$00 \$00 \$00 \$00 \$56 \$41 \$4C \$44 \$45 \$52 \$54 \$41 \$4E \$37
15765_29_ECU8_SID\$09_INF\$00	\$18 \$DA \$F1 \$17 \$49 \$00 \$14 \$40 \$00 \$00
15765_29_ECU8_SID\$09_INF\$00_DIESEL	\$18 \$DA \$F1 \$17 \$49 \$00 \$14 \$4A \$00 \$00
15765_29_ECU8_SID\$09_INF\$04_9	\$18 \$DA \$F1 \$17 \$49 \$04 \$09 \$31 \$38 \$35 \$38 \$39 \$37 \$37 \$38 \$00 \$00 \$00 \$00 \$00 \$00 \$00 \$00 \$00 \$32 \$38 \$35 \$38 \$39 \$37 \$37 \$37 \$00 \$00 \$00 \$00 \$00 \$00 \$00 \$00 \$00 \$33 \$38 \$35 \$38 \$39 \$37 \$37 \$36 \$00 \$00 \$00 \$00 \$00 \$00 \$00 \$00 \$00 \$34 \$38 \$35 \$38 \$39 \$37 \$37 \$35 \$00 \$00 \$00 \$00 \$00 \$00 \$00 \$00 \$00 \$35 \$38 \$35 \$38 \$39 \$37 \$37 \$34 \$00 \$00 \$00 \$00 \$00 \$00 \$00 \$00 \$00 \$36 \$38 \$35 \$38 \$39 \$37 \$37 \$33 \$00 \$00 \$00 \$00 \$00 \$00 \$00 \$00 \$00 \$37 \$38 \$35 \$38 \$39 \$37 \$37 \$32 \$00 \$00 \$00 \$00 \$00 \$00 \$00 \$00 \$00 \$38 \$38 \$35 \$38 \$39 \$37 \$37 \$31 \$00 \$00 \$00 \$00 \$00 \$00 \$00 \$00 \$00 \$39 \$38 \$35 \$38 \$39 \$37 \$37 \$30 \$00 \$00 \$00 \$00 \$00 \$00 \$00 \$00 \$00
15765_29_ECU8_SID\$09_INF\$06_9	\$18 \$DA \$F1 \$17 \$49 \$06 \$09 \$87 \$91 \$BC \$88 \$88 \$91 \$BC \$87 \$89 \$91 \$BC \$86 \$8A \$91 \$BC \$85 \$8B \$91 \$BC \$84 \$8C \$91 \$BC \$83 \$8D \$91 \$BC \$82 \$8E \$55 \$AA \$81 \$8F \$FF \$00 \$80
15765_29_ECU7_SID\$09_INF\$0A	\$18 \$DA \$F1 \$17 \$49 \$0A \$01 \$54 \$43 \$43 \$32 \$2D \$54 \$72 \$61 \$6E \$73 \$66 \$43 \$61 \$73 \$65 \$43 \$74 \$72 \$6C \$32
15765_29_ECU8_SID\$09_INF\$0D	\$18 \$DA \$F1 \$17 \$49 \$0D \$01 \$00 \$00 \$00 \$00 \$56 \$41 \$4C \$44 \$45 \$53 \$4E \$39 \$38 \$37 \$36 \$35 \$38
15765_29_ECU8_SID\$09_INF\$0F	\$18 \$DA \$F1 \$17 \$49 \$0F \$01 \$00 \$00 \$00 \$00 \$00 \$00 \$56 \$41 \$4C \$44 \$45 \$52 \$54 \$41 \$4E \$38
15765_29_SID\$0A	\$18 \$DB \$33 \$F1 \$0A
15765_29_ECU1_SID\$0A_NoDTC	\$18 \$DA \$F1 \$10 \$4A \$00
15765_29_ECU1_SID\$0A_DTC	\$18 \$DA \$F1 \$10 \$4A \$04 \$01 \$07 \$01 \$10 \$01 \$15 \$01 \$24
15765_29_ECU2_SID\$0A_NoDTC	\$18 \$DA \$F1 \$11 \$4A \$00

The first four bytes are the CAN ID bits 28-24 first, followed by CAN ID bits 23-16, CAN ID bits 15-8, CAN ID bits 7-0.

Figure 8 - Pre-defined messages for ISO 15765-4 (29-bit)

5.4.3.4 ISO 15765-4 Message Timing

For convenience, the test cases in this document will use the text in the 'Parameter Reference' column when referring to the specific value, detailed in the 'Value' column of the table below. Unless otherwise specified, the following timing values shall be used:

Parameter Reference	Value
P2_MIN	0 ms
P2	5 ms
P2_MAX	50 ms
P2_MIN_78	0 ms
P2_78	2500 ms
P2_MAX_78	5000 ms

Figure 9 - Pre-defined message timing for ISO 15765-4

5.4.3.5 ISO 15765-4 (11-bit, 500K) Monitor State

The device shall initially be in the 'Power On' state, connected to the CAN network with the appropriate termination (as depicted in 5.4.3.1), and configured for 11-bit CAN Identifiers at a baud rate of 500000. The device shall not generate any In-Frame Acknowledgements on the CAN network, but shall interpret messages according to the ISO 15765-2 format (that is, verify and remove the PCI byte).

5.4.3.6 ISO 15765-4 (11-bit, 250K) Connected State

The device shall initially be in the 'Power On' state, connected to the CAN network with the appropriate termination (as depicted in 5.4.3.1), and configured for 11-bit CAN Identifiers at a baud rate of 250000.

5.4.3.7 ISO 15765-4 (11-bit, 500K) Connected State

The device shall initially be in the 'Power On' state, connected to the CAN network with the appropriate termination (as depicted in 5.4.3.1), and configured for 11-bit CAN Identifiers at a baud rate of 500000.

5.4.3.8 ISO 15765-4 (29-bit, 500K) Connected State

The device shall initially be in the 'Power On' state, connected to the CAN network with the appropriate termination (as depicted in 5.4.3.1), and configured for 29-bit CAN Identifiers at a baud rate of 500000.

5.4.3.9 ISO 15765-4 (11-bit, 500K, 2 ECUs) Initialized State

The OBD network shall have determined to be ISO 15765-4 with 11-bit CAN Identifiers at a baud rate of 500000 with two OBD II ECUs having been identified. The DUT may produce a periodic message transmission to keep the network alive. A successful completion of 8.2.2 shall define this state.

5.4.3.10 ISO 15765-4 (29-bit, 500K, 2 ECUs) Initialized State

The OBD network shall have determined to be ISO 15765-4 with 29-bit CAN Identifiers at a baud rate of 500000 with two OBD II ECUs having been identified. The DUT may produce a periodic message transmission to keep the network alive. A successful completion of 8.2.3 shall define this state.

5.4.3.11 ISO 15765-4 (11-bit, 500K, 8 ECUs) Initialized State

The OBD network shall have determined to be ISO 15765-4 with 11-bit CAN Identifiers at a baud rate of 500000 with eight OBD II ECUs having been identified. The DUT may produce a periodic message transmission to keep the network alive. A successful completion of 8.2.4 shall define this state.

5.4.3.12 ISO 15765-4 (29-bit, 500K, 8 ECUs) Initialized State

The OBD network shall have determined to be ISO 15765-4 with 29-bit CAN Identifiers at a baud rate of 500000 with eight OBD II ECUs having been identified. The DUT may produce a periodic message transmission to keep the network alive. A successful completion of 8.2.5 shall define this state.

5.4.3.13 ISO 15765-4 (11-bit, 500K, 2 ECUs) SID9 Ready State

The SID \$09 INFOTYPES shall be known for each of the two OBD II ECUs on the network. The DUT may produce a periodic message transmission to keep the network alive. A successful completion of 0 shall define this state.

5.4.3.14 ISO 15765-4 (11-bit, 500K, 2 ECUs) SID9 Diesel Ready State

The SID \$09 INFOTYPES shall be known for each of the two OBD II ECUs on the network. The DUT may produce a periodic message transmission to keep the network alive. A successful completion of 9.2.38 shall define this state.

5.4.3.15 ISO 15765-4 (29-bit, 500K, 2 ECUs) SID9 Ready State

The SID \$09 INFOTYPES shall be known for each of the two OBD II ECUs on the network. The DUT may produce a periodic message transmission to keep the network alive. A successful completion of 9.2.39 shall define this state.

5.4.3.16 ISO 15765-4 (29-bit, 500K, 2 ECUs) SID9 Diesel Ready State

The SID \$09 INFOTYPES shall be known for each of the two OBD II ECUs on the network. The DUT may produce a periodic message transmission to keep the network alive. A successful completion of 9.2.40 shall define this state.

5.4.3.17 ISO 15765-4 (11-bit, 500K, 8 ECUs) SID9 Ready State

The SID \$09 INFOTYPES shall be known for each of the eight OBD II ECUs on the network. The DUT may produce a periodic message transmission to keep the network alive. A successful completion of 9.2.41 shall define this state.

5.4.3.18 ISO 15765-4 (11-bit, 500K, 8 ECUs) SID9 Diesel Ready State

The SID \$09 INFOTYPES shall be known for each of the eight OBD II ECUs on the network. The DUT may produce a periodic message transmission to keep the network alive. A successful completion of 0 shall define this state.

5.4.3.19 ISO 15765-4 (29-bit, 500K, 8 ECUs) SID9 Ready State

The SID \$09 INFOTYPES shall be known for each of the eight OBD II ECUs on the network. The DUT may produce a periodic message transmission to keep the network alive. A successful completion of 0 shall define this state.

5.4.3.20 ISO 15765-4 (29-bit, 500K, 8 ECUs) SID9 Diesel Ready State

The SID \$09 INFOTYPES shall be known for each of the eight OBD II ECUs on the network. The DUT may produce a periodic message transmission to keep the network alive. A successful completion of 0 shall define this state.

5.4.4 ISO 14230-4

5.4.4.1 ISO 14230-4 Electrical Connections

Figure 10 outlines the typical set-up for ISO 14230-4 testing.

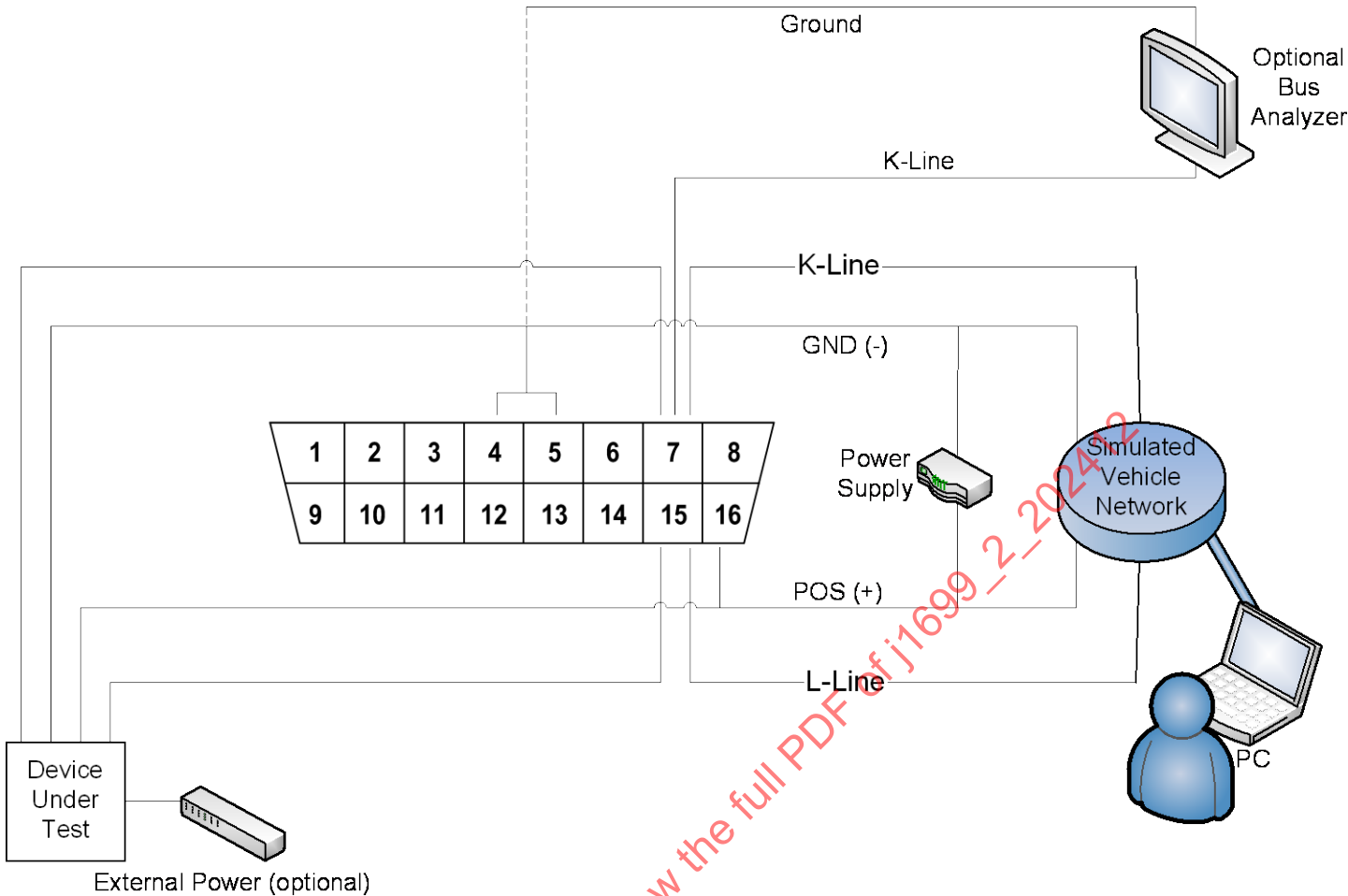


Figure 10 - Test set-up for ISO 14230-4 testing

5.4.4.2 ISO 14230-4 ECU Addresses

The following address bytes have been pre-defined for ISO 14230-4. For convenience, the test cases in this document will use the text in the 'ECU Reference' column when referring to the specific set of address bytes, detailed in the 'Address Bytes' column of the table below.

ECU Reference	Address Bytes
ECU #1	\$10
ECU #2	\$11
ECU #3	\$12
ECU #4	\$13
ECU #5	\$14
ECU #6	\$15
ECU #7	\$16
ECU #8	\$17

Figure 11 - ECU reference and associated addresses for ISO 14230-4

5.4.4.3 ISO 14230-4 Messages

The following messages have been pre-defined for ISO 14230-4. For convenience, the test cases in this document will use the text in the 'Message Reference' column when referring to the specific set of message bytes, detailed in the 'Message Bytes' column of the table below.

Message Reference	Message Bytes
14230 START_COMM	\$C1 \$33 \$F1 \$81 CS
14230 ECU1 START_COMM E98F	\$83 \$F1 \$10 \$C1 \$E9 \$8F CS
14230 ECU1 START_COMM 6B8F	\$83 \$F1 \$10 \$C1 \$6B \$8F CS
14230 ECU1 START_COMM 6D8F	\$83 \$F1 \$10 \$C1 \$6D \$8F CS
14230 ECU1 START_COMM EF8F	\$83 \$F1 \$10 \$C1 \$EF \$8F CS
14230 ECU1 START_COMM NO_KB	\$83 \$F1 \$18 \$C1 CS
14230 ECU1 START_COMM_0000	\$83 \$F1 \$18 \$C1 \$00 \$00 CS
14230 SID\$01 PID\$00	\$C2 \$33 \$F1 \$01 \$00 CS
14230 ECU1 SID\$01 PID\$00	\$86 \$F1 \$10 \$41 \$00 \$80 \$10 \$00 \$00 CS
14230 ECU2 SID\$01 PID\$00	\$86 \$F1 \$11 \$41 \$00 \$80 \$10 \$00 \$00 CS
14230 ECU3 SID\$01 PID\$00	\$86 \$F1 \$12 \$41 \$00 \$00 \$00 \$00 \$00 CS
14230 ECU4 SID\$01 PID\$00	\$86 \$F1 \$13 \$41 \$00 \$00 \$00 \$00 \$00 CS
14230 ECU5 SID\$01 PID\$00	\$86 \$F1 \$14 \$41 \$00 \$00 \$00 \$00 \$00 CS
14230 ECU6 SID\$01 PID\$00	\$86 \$F1 \$15 \$41 \$00 \$00 \$00 \$00 \$00 CS
14230 ECU7 SID\$01 PID\$00	\$86 \$F1 \$16 \$41 \$00 \$00 \$00 \$00 \$00 CS
14230 ECU8 SID\$01 PID\$00	\$86 \$F1 \$17 \$41 \$00 \$00 \$00 \$00 \$00 CS
14230 ECU18 SID\$01 PID\$00	\$86 \$F1 \$18 \$41 \$00 \$00 \$00 \$00 \$00 CS
14230 SID\$01 PID\$01	\$C2 \$33 \$F1 \$01 \$01 CS
14230 SID\$01 PID\$0C	\$C2 \$33 \$F1 \$01 \$0C CS
14230 SID\$01 PID\$20	\$C2 \$33 \$F1 \$01 \$20 CS
14230 SID\$01 PID\$40	\$C2 \$33 \$F1 \$01 \$40 CS
14230 SID\$01 PID\$41	\$C2 \$33 \$F1 \$01 \$41 CS
14230 ECU1 SID\$01 PID\$00_20	\$86 \$F1 \$10 \$41 \$00 \$80 \$10 \$00 \$01 CS
14230 ECU1 SID\$01 PID\$01 SPARK	\$86 \$F1 \$10 \$41 \$01 \$00 \$07 \$EF \$EF CS
14230 ECU1 SID\$01 PID\$01 COMP	\$86 \$F1 \$10 \$41 \$01 \$00 \$0F \$EB \$EB CS
14230 ECU1 SID\$01 PID\$0C KOEO	\$84 \$F1 \$10 \$41 \$0C \$00 \$00 CS
14230 ECU1 SID\$01 PID\$20	\$86 \$F1 \$10 \$41 \$20 \$00 \$00 \$00 \$01 CS
14230 ECU1 SID\$01 PID\$40	\$86 \$F1 \$10 \$41 \$40 \$10 \$00 \$00 \$00 CS
14230 ECU1 SID\$01 PID\$41 SPARK	\$86 \$F1 \$10 \$41 \$41 \$00 \$07 \$EF \$EF CS
14230 ECU2 SID\$01 PID\$01 SPARK	\$86 \$F1 \$11 \$41 \$01 \$81 \$44 \$00 \$00 CS
14230 ECU2 SID\$01 PID\$01 COMP	\$86 \$F1 \$11 \$41 \$01 \$81 \$4C \$00 \$00 CS
14230 ECU2 SID\$01 PID\$0C KOEO	\$84 \$F1 \$11 \$41 \$0C \$00 \$00 CS
14230 SID\$02 PID\$02	\$C3 \$33 \$F1 \$02 \$02 \$00 CS
14230 ECU1 SID\$02 PID\$02 NoDTC	\$85 \$F1 \$10 \$42 \$02 \$00 \$00 \$00 CS
14230 ECU2 SID\$02 PID\$02 NoDTC	\$85 \$F1 \$11 \$42 \$02 \$00 \$00 \$00 CS
14230 ECU1 SID\$02 PID\$02 DTC	\$85 \$F1 \$10 \$42 \$02 \$00 \$01 \$07 CS
14230 SID\$03	\$C2 \$33 \$F1 \$03 CS
14230 ECU1 SID\$03 NoDTC	\$82 \$F1 \$10 \$43 \$00 CS
14230 ECU1 SID\$03 DTC M1	\$8A \$F1 \$10 \$43 \$01 \$07 \$01 \$10 \$01 \$15 CS
14230 ECU1 SID\$03 DTC M2	\$8A \$F1 \$10 \$43 \$01 \$24 \$00 \$00 \$00 \$00 CS
14230 ECU2 SID\$03 NoDTC	\$82 \$F1 \$11 \$43 \$00 CS
14230 SID\$04	\$C2 \$33 \$F1 \$04CS
14230 ECU1 SID\$04 DONE	\$81 \$F1 \$10 \$44 CS
14230 ECU1 SID\$04 NRC22	\$83 \$F1 \$10 \$7F \$44 \$22 CS
14230 ECU1 SID\$04 NRC78	\$83 \$F1 \$10 \$7F \$44 \$78 CS
14230 ECU2 SID\$04 DONE	\$81 \$F1 \$11 \$44 CS
14230 ECU2 SID\$04 NRC22	\$83 \$F1 \$11 \$7F \$44 \$22 CS
14230 SID\$05 TID\$01	\$C3 \$33 \$F1 \$05 \$01 \$02 CS
14230 ECU1 SID\$05 TID\$01	\$86 \$F1 \$10 \$45 \$01 \$02 \$5A CS
14230 SID\$06 MID\$00	\$C2 \$33 \$F1 \$06 \$00 CS
14230 ECU1 SID\$06 MID\$00	\$86 \$F1 \$10 \$46 \$00 \$CC \$00 \$00 \$00 CS

14230	SID\$07	\$C1 \$33 \$F1 \$07 CS
14230	ECU1 SID\$07 NoDTC	\$82 \$F1 \$10 \$47 \$00 CS
14230	ECU1 SID\$07 DTC M1	\$8A \$F1 \$10 \$47 \$01 \$07 \$01 \$10 \$01 \$15 CS
14230	ECU1 SID\$07 DTC M2	\$8A \$F1 \$10 \$47 \$01 \$24 \$00 \$00 \$00 \$00 CS
14230	ECU2 SID\$07 NoDTC	\$82 \$F1 \$11 \$47 \$00 CS
14230	SID\$08 TID\$00	\$C1 \$33 \$F1 \$08 CS
14230	ECU1 SID\$08 TID\$00	\$86 \$F1 \$10 \$48 \$00 \$80 \$00 \$00 \$00 CS
14230	SID\$09 INF\$00	\$C2 \$33 \$F1 \$09 \$00 CS
14230	SID\$09 INF\$01	\$C2 \$33 \$F1 \$09 \$01 CS
14230	SID\$09 INF\$02	\$C2 \$33 \$F1 \$09 \$02 CS
14230	SID\$09 INF\$03	\$C2 \$33 \$F1 \$09 \$03 CS
14230	SID\$09 INF\$04	\$C2 \$33 \$F1 \$09 \$04 CS
14230	SID\$09 INF\$05	\$C2 \$33 \$F1 \$09 \$05 CS
14230	SID\$09 INF\$06	\$C2 \$33 \$F1 \$09 \$06 CS
14230	SID\$09 INF\$07	\$C2 \$33 \$F1 \$09 \$07 CS
14230	SID\$09 INF\$08	\$C2 \$33 \$F1 \$09 \$08 CS
14230	SID\$09 INF\$0B	\$C2 \$33 \$F1 \$09 \$0B CS
14230	ECU1 SID\$09 INF\$00	\$86 \$F1 \$10 \$49 \$00 \$FF \$00 \$00 \$00 CS
14230	ECU1 SID\$09 INF\$00 DIESEL	\$86 \$F1 \$10 \$49 \$00 \$FE \$20 \$00 \$00 CS
14230	ECU1 SID\$09 INF\$01	\$83 \$F1 \$10 \$49 \$01 \$05 CS
14230	ECU1 SID\$09 INF\$02 M1	\$87 \$F1 \$10 \$49 \$02 \$01 \$00 \$00 \$00 \$31 CS
14230	ECU1 SID\$09 INF\$02 M2	\$87 \$F1 \$10 \$49 \$02 \$02 \$47 \$59 \$44 \$45 CS
14230	ECU1 SID\$09 INF\$02 M3	\$87 \$F1 \$10 \$49 \$02 \$03 \$36 \$33 \$41 \$37 CS
14230	ECU1 SID\$09 INF\$02 M4	\$87 \$F1 \$10 \$49 \$02 \$04 \$41 \$30 \$30 \$30 CS
14230	ECU1 SID\$09 INF\$02 M5	\$87 \$F1 \$10 \$49 \$02 \$05 \$30 \$30 \$30 \$30 CS
14230	ECU1 SID\$09 INF\$03	\$83 \$F1 \$10 \$49 \$03 \$04 CS
14230	ECU1 SID\$09 INF\$03 9	\$83 \$F1 \$10 \$49 \$03 \$24 CS
14230	ECU1 SID\$09 INF\$04 M1	\$87 \$F1 \$10 \$49 \$04 \$01 \$31 \$32 \$35 \$38 CS
14230	ECU1 SID\$09 INF\$04 M2	\$87 \$F1 \$10 \$49 \$04 \$02 \$39 \$37 \$37 \$32 CS
14230	ECU1 SID\$09 INF\$04 M3	\$87 \$F1 \$10 \$49 \$04 \$03 \$00 \$00 \$00 \$00 CS
14230	ECU1 SID\$09 INF\$04 M4	\$87 \$F1 \$10 \$49 \$04 \$04 \$00 \$00 \$00 \$00 CS
14230	ECU1 SID\$09 INF\$04 9 M1	\$87 \$F1 \$10 \$49 \$04 \$01 \$31 \$31 \$35 \$38 CS
14230	ECU1 SID\$09 INF\$04 9 M2	\$87 \$F1 \$10 \$49 \$04 \$02 \$39 \$37 \$37 \$38 CS
14230	ECU1 SID\$09 INF\$04 9 M3	\$87 \$F1 \$10 \$49 \$04 \$03 \$00 \$00 \$00 \$00 CS
14230	ECU1 SID\$09 INF\$04 9 M4	\$87 \$F1 \$10 \$49 \$04 \$04 \$00 \$00 \$00 \$00 CS
14230	ECU1 SID\$09 INF\$04 9 M5	\$87 \$F1 \$10 \$49 \$04 \$05 \$32 \$31 \$35 \$38 CS
14230	ECU1 SID\$09 INF\$04 9 M6	\$87 \$F1 \$10 \$49 \$04 \$06 \$39 \$37 \$37 \$37 CS
14230	ECU1 SID\$09 INF\$04 9 M7	\$87 \$F1 \$10 \$49 \$04 \$07 \$00 \$00 \$00 \$00 CS
14230	ECU1 SID\$09 INF\$04 9 M8	\$87 \$F1 \$10 \$49 \$04 \$08 \$00 \$00 \$00 \$00 CS
14230	ECU1 SID\$09 INF\$04 9 M9	\$87 \$F1 \$10 \$49 \$04 \$09 \$33 \$31 \$35 \$38 CS
14230	ECU1 SID\$09 INF\$04 9 M10	\$87 \$F1 \$10 \$49 \$04 \$0A \$39 \$37 \$37 \$36 CS
14230	ECU1 SID\$09 INF\$04 9 M11	\$87 \$F1 \$10 \$49 \$04 \$0B \$00 \$00 \$00 \$00 CS
14230	ECU1 SID\$09 INF\$04 9 M12	\$87 \$F1 \$10 \$49 \$04 \$0C \$00 \$00 \$00 \$00 CS
14230	ECU1 SID\$09 INF\$04 9 M13	\$87 \$F1 \$10 \$49 \$04 \$0D \$34 \$31 \$35 \$38 CS
14230	ECU1 SID\$09 INF\$04 9 M14	\$87 \$F1 \$10 \$49 \$04 \$0E \$39 \$37 \$37 \$35 CS
14230	ECU1 SID\$09 INF\$04 9 M15	\$87 \$F1 \$10 \$49 \$04 \$0F \$00 \$00 \$00 \$00 CS
14230	ECU1 SID\$09 INF\$04 9 M16	\$87 \$F1 \$10 \$49 \$04 \$10 \$00 \$00 \$00 \$00 CS
14230	ECU1 SID\$09 INF\$04 9 M17	\$87 \$F1 \$10 \$49 \$04 \$11 \$35 \$31 \$35 \$38 CS
14230	ECU1 SID\$09 INF\$04 9 M18	\$87 \$F1 \$10 \$49 \$04 \$12 \$39 \$37 \$37 \$34 CS
14230	ECU1 SID\$09 INF\$04 9 M19	\$87 \$F1 \$10 \$49 \$04 \$13 \$00 \$00 \$00 \$00 CS
14230	ECU1 SID\$09 INF\$04 9 M20	\$87 \$F1 \$10 \$49 \$04 \$14 \$00 \$00 \$00 \$00 CS
14230	ECU1 SID\$09 INF\$04 9 M21	\$87 \$F1 \$10 \$49 \$04 \$15 \$36 \$31 \$35 \$38 CS
14230	ECU1 SID\$09 INF\$04 9 M22	\$87 \$F1 \$10 \$49 \$04 \$16 \$39 \$37 \$37 \$33 CS
14230	ECU1 SID\$09 INF\$04 9 M23	\$87 \$F1 \$10 \$49 \$04 \$17 \$00 \$00 \$00 \$00 CS
14230	ECU1 SID\$09 INF\$04 9 M24	\$87 \$F1 \$10 \$49 \$04 \$18 \$00 \$00 \$00 \$00 CS
14230	ECU1 SID\$09 INF\$04 9 M25	\$87 \$F1 \$10 \$49 \$04 \$19 \$37 \$31 \$35 \$38 CS
14230	ECU1 SID\$09 INF\$04 9 M26	\$87 \$F1 \$10 \$49 \$04 \$1A \$39 \$37 \$37 \$32 CS
14230	ECU1 SID\$09 INF\$04 9 M27	\$87 \$F1 \$10 \$49 \$04 \$1B \$00 \$00 \$00 \$00 CS

14230	ECU1	SID\$09	INF\$04	9	M28	\$87	\$F1	\$10	\$49	\$04	\$1C	\$00	\$00	\$00	\$00	CS
14230	ECU1	SID\$09	INF\$04	9	M29	\$87	\$F1	\$10	\$49	\$04	\$1D	\$38	\$31	\$35	\$38	CS
14230	ECU1	SID\$09	INF\$04	9	M30	\$87	\$F1	\$10	\$49	\$04	\$1E	\$39	\$37	\$37	\$31	CS
14230	ECU1	SID\$09	INF\$04	9	M31	\$87	\$F1	\$10	\$49	\$04	\$1F	\$00	\$00	\$00	\$00	CS
14230	ECU1	SID\$09	INF\$04	9	M32	\$87	\$F1	\$10	\$49	\$04	\$20	\$00	\$00	\$00	\$00	CS
14230	ECU1	SID\$09	INF\$04	9	M33	\$87	\$F1	\$10	\$49	\$04	\$21	\$39	\$31	\$35	\$38	CS
14230	ECU1	SID\$09	INF\$04	9	M34	\$87	\$F1	\$10	\$49	\$04	\$22	\$39	\$37	\$37	\$30	CS
14230	ECU1	SID\$09	INF\$04	9	M35	\$87	\$F1	\$10	\$49	\$04	\$23	\$00	\$00	\$00	\$00	CS
14230	ECU1	SID\$09	INF\$04	9	M36	\$87	\$F1	\$10	\$49	\$04	\$24	\$00	\$00	\$00	\$00	CS
14230	ECU1	SID\$09	INF\$05			\$83	\$F1	\$10	\$49	\$05	\$01					CS
14230	ECU1	SID\$09	INF\$05	9		\$83	\$F1	\$10	\$49	\$05	\$09					CS
14230	ECU1	SID\$09	INF\$06			\$87	\$F1	\$10	\$49	\$06	\$01	\$17	\$91	\$BC	\$88	CS
14230	ECU1	SID\$09	INF\$06	9	M1	\$87	\$F1	\$10	\$49	\$06	\$01	\$17	\$91	\$BC	\$88	CS
14230	ECU1	SID\$09	INF\$06	9	M2	\$87	\$F1	\$10	\$49	\$06	\$02	\$18	\$91	\$BC	\$87	CS
14230	ECU1	SID\$09	INF\$06	9	M3	\$87	\$F1	\$10	\$49	\$06	\$03	\$19	\$91	\$BC	\$86	CS
14230	ECU1	SID\$09	INF\$06	9	M4	\$87	\$F1	\$10	\$49	\$06	\$04	\$1A	\$91	\$BC	\$85	CS
14230	ECU1	SID\$09	INF\$06	9	M5	\$87	\$F1	\$10	\$49	\$06	\$05	\$1B	\$91	\$BC	\$84	CS
14230	ECU1	SID\$09	INF\$06	9	M6	\$87	\$F1	\$10	\$49	\$06	\$06	\$1C	\$91	\$BC	\$83	CS
14230	ECU1	SID\$09	INF\$06	9	M7	\$87	\$F1	\$10	\$49	\$06	\$07	\$1D	\$91	\$BC	\$82	CS
14230	ECU1	SID\$09	INF\$06	9	M8	\$87	\$F1	\$10	\$49	\$06	\$08	\$1E	\$55	\$AA	\$81	CS
14230	ECU1	SID\$09	INF\$06	9	M9	\$87	\$F1	\$10	\$49	\$06	\$09	\$1F	\$FF	\$00	\$80	CS
14230	ECU1	SID\$09	INF\$07	832		\$83	\$F1	\$10	\$49	\$07	\$08					CS
14230	ECU1	SID\$09	INF\$07	840		\$83	\$F1	\$10	\$49	\$07	\$0A					CS
14230	ECU1	SID\$09	INF\$07	B32		\$83	\$F1	\$10	\$49	\$07	\$08					CS
14230	ECU1	SID\$09	INF\$07	B36		\$83	\$F1	\$10	\$49	\$07	\$09					CS
14230	ECU1	SID\$09	INF\$08	32	M1	\$87	\$F1	\$10	\$49	\$08	\$01	\$00	\$64	\$00	\$69	CS
14230	ECU1	SID\$09	INF\$08	32	M2	\$87	\$F1	\$10	\$49	\$08	\$02	\$00	\$0A	\$00	\$0F	CS
14230	ECU1	SID\$09	INF\$08	32	M3	\$87	\$F1	\$10	\$49	\$08	\$03	\$00	\$00	\$00	\$00	CS
14230	ECU1	SID\$09	INF\$08	32	M4	\$87	\$F1	\$10	\$49	\$08	\$04	\$00	\$1E	\$00	\$23	CS
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14230	ECU1	SID\$09	INF\$0B	32	M8	\$87	\$F1	\$10	\$49	\$0B	\$08	\$00	\$46	\$00	\$4B	CS
14230	ECU1	SID\$09	INF\$0B	36	M1	\$87	\$F1	\$10	\$49	\$0B	\$01	\$00	\$64	\$00	\$69	CS
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14230	ECU1	SID\$09	INF\$0B	36	M8	\$87	\$F1	\$10	\$49	\$0B	\$08	\$00	\$46	\$00	\$4B	CS
14230	ECU1	SID\$09	INF\$0B	36	M9	\$87	\$F1	\$10	\$49	\$0B	\$09	\$00	\$50	\$00	\$55	CS
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14230	ECU2	SID\$09	INF\$04		M1	\$87	\$F1	\$11	\$49	\$04	\$01	\$32	\$34	\$32	\$32	CS
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14230	ECU2	SID\$09	INF\$04	9	M11	\$87	\$F1	\$11	\$49	\$04	\$0B	\$00	\$00	\$00	\$00	CS
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14230	ECU2	SID\$09	INF\$04	9	M20	\$87	\$F1	\$11	\$49	\$04	\$14	\$00	\$00	\$00	\$00	CS
14230	ECU2	SID\$09	INF\$04	9	M21	\$87	\$F1	\$11	\$49	\$04	\$15	\$36	\$32	\$35	\$38	CS
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14230	ECU2	SID\$09	INF\$04	9	M23	\$87	\$F1	\$11	\$49	\$04	\$17	\$00	\$00	\$00	\$00	CS
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14230	ECU2	SID\$09	INF\$04	9	M31	\$87	\$F1	\$11	\$49	\$04	\$1F	\$00	\$00	\$00	\$00	CS
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14230	ECU2	SID\$09	INF\$06	9	M2	\$87	\$F1	\$11	\$49	\$06	\$02	\$28	\$91	\$BC	\$87	CS
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14230	ECU2	SID\$09	INF\$08	32	M1	\$87	\$F1	\$11	\$49	\$08	\$01	\$00	\$64	\$00	\$69	CS
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14230	ECU2	SID\$09	INF\$0B	32	M1	\$87	\$F1	\$11	\$49	\$0B	\$01	\$00	\$64	\$00	\$69	CS
14230	ECU2	SID\$09	INF\$0B	32	M2	\$87	\$F1	\$11	\$49	\$0B	\$02	\$00	\$00	\$00	\$00	CS
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14230	ECU2	SID\$09	INF\$0B	36	M3	\$87	\$F1	\$11	\$49	\$0B	\$03	\$00	\$14	\$00	\$19	CS
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14230	ECU2	SID\$09	INF\$0B	36	M5	\$87	\$F1	\$11	\$49	\$0B	\$05	\$00	\$28	\$00	\$2D	CS
14230	ECU2	SID\$09	INF\$0B	36	M6	\$87	\$F1	\$11	\$49	\$0B	\$06	\$00	\$00	\$00	\$00	CS
14230	ECU2	SID\$09	INF\$0B	36	M7	\$87	\$F1	\$11	\$49	\$0B	\$07	\$00	\$00	\$00	\$00	CS
14230	ECU2	SID\$09	INF\$0B	36	M8	\$87	\$F1	\$11	\$49	\$0B	\$08	\$00	\$00	\$00	\$00	CS
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14230	ECU3	SID\$09	INF\$04	9	M17	\$87	\$F1	\$12	\$49	\$04	\$11	\$35	\$33	\$35	\$38	CS
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14230	ECU6	SID\$09	INF\$04	9	M25	\$87	\$F1	\$15	\$49	\$04	\$19	\$37	\$36	\$35	\$38	CS
14230	ECU6	SID\$09	INF\$04	9	M26	\$87	\$F1	\$15	\$49	\$04	\$1A	\$39	\$37	\$37	\$32	CS
14230	ECU6	SID\$09	INF\$04	9	M27	\$87	\$F1	\$15	\$49	\$04	\$1B	\$00	\$00	\$00	\$00	CS
14230	ECU6	SID\$09	INF\$04	9	M28	\$87	\$F1	\$15	\$49	\$04	\$1C	\$00	\$00	\$00	\$00	CS
14230	ECU6	SID\$09	INF\$04	9	M29	\$87	\$F1	\$15	\$49	\$04	\$1D	\$38	\$36	\$35	\$38	CS
14230	ECU6	SID\$09	INF\$04	9	M30	\$87	\$F1	\$15	\$49	\$04	\$1E	\$39	\$37	\$37	\$31	CS
14230	ECU6	SID\$09	INF\$04	9	M31	\$87	\$F1	\$15	\$49	\$04	\$1F	\$00	\$00	\$00	\$00	CS
14230	ECU6	SID\$09	INF\$04	9	M32	\$87	\$F1	\$15	\$49	\$04	\$20	\$00	\$00	\$00	\$00	CS
14230	ECU6	SID\$09	INF\$04	9	M33	\$87	\$F1	\$15	\$49	\$04	\$21	\$39	\$36	\$35	\$38	CS
14230	ECU6	SID\$09	INF\$04	9	M34	\$87	\$F1	\$15	\$49	\$04	\$22	\$39	\$37	\$37	\$30	CS
14230	ECU6	SID\$09	INF\$04	9	M35	\$87	\$F1	\$15	\$49	\$04	\$23	\$00	\$00	\$00	\$00	CS
14230	ECU6	SID\$09	INF\$04	9	M36	\$87	\$F1	\$15	\$49	\$04	\$24	\$00	\$00	\$00	\$00	CS
14230	ECU6	SID\$09	INF\$05	9		\$83	\$F1	\$15	\$49	\$05	\$09	CS				
14230	ECU6	SID\$09	INF\$06	9	M1	\$87	\$F1	\$15	\$49	\$06	\$01	\$67	\$91	\$BC	\$88	CS
14230	ECU6	SID\$09	INF\$06	9	M2	\$87	\$F1	\$15	\$49	\$06	\$02	\$68	\$91	\$BC	\$87	CS
14230	ECU6	SID\$09	INF\$06	9	M3	\$87	\$F1	\$15	\$49	\$06	\$03	\$69	\$91	\$BC	\$86	CS
14230	ECU6	SID\$09	INF\$06	9	M4	\$87	\$F1	\$15	\$49	\$06	\$04	\$6A	\$91	\$BC	\$85	CS
14230	ECU6	SID\$09	INF\$06	9	M5	\$87	\$F1	\$15	\$49	\$06	\$05	\$6B	\$91	\$BC	\$84	CS
14230	ECU6	SID\$09	INF\$06	9	M6	\$87	\$F1	\$15	\$49	\$06	\$06	\$6C	\$91	\$BC	\$83	CS
14230	ECU6	SID\$09	INF\$06	9	M7	\$87	\$F1	\$15	\$49	\$06	\$07	\$6D	\$91	\$BC	\$82	CS
14230	ECU6	SID\$09	INF\$06	9	M8	\$87	\$F1	\$15	\$49	\$06	\$08	\$6E	\$55	\$AA	\$81	CS
14230	ECU6	SID\$09	INF\$06	9	M9	\$87	\$F1	\$15	\$49	\$06	\$09	\$6F	\$FF	\$00	\$80	CS

14230	ECU7	SID\$09	INF\$00		\$86	\$F1	\$16	\$49	\$00	\$3C	\$00	\$00	\$00	CS
14230	ECU7	SID\$09	INF\$03	9	\$83	\$F1	\$16	\$49	\$03	\$24				CS
14230	ECU7	SID\$09	INF\$04	9 M1	\$87	\$F1	\$16	\$49	\$04	\$01	\$31	\$37	\$35	\$38 CS
14230	ECU7	SID\$09	INF\$04	9 M2	\$87	\$F1	\$16	\$49	\$04	\$02	\$39	\$37	\$37	\$38 CS
14230	ECU7	SID\$09	INF\$04	9 M3	\$87	\$F1	\$16	\$49	\$04	\$03	\$00	\$00	\$00	\$00 CS
14230	ECU7	SID\$09	INF\$04	9 M4	\$87	\$F1	\$16	\$49	\$04	\$04	\$00	\$00	\$00	\$00 CS
14230	ECU7	SID\$09	INF\$04	9 M5	\$87	\$F1	\$16	\$49	\$04	\$05	\$32	\$37	\$35	\$38 CS
14230	ECU7	SID\$09	INF\$04	9 M6	\$87	\$F1	\$16	\$49	\$04	\$06	\$39	\$37	\$37	\$37 CS
14230	ECU7	SID\$09	INF\$04	9 M7	\$87	\$F1	\$16	\$49	\$04	\$07	\$00	\$00	\$00	\$00 CS
14230	ECU7	SID\$09	INF\$04	9 M8	\$87	\$F1	\$16	\$49	\$04	\$08	\$00	\$00	\$00	\$00 CS
14230	ECU7	SID\$09	INF\$04	9 M9	\$87	\$F1	\$16	\$49	\$04	\$09	\$33	\$37	\$35	\$38 CS
14230	ECU7	SID\$09	INF\$04	9 M10	\$87	\$F1	\$16	\$49	\$04	\$0A	\$39	\$37	\$37	\$36 CS
14230	ECU7	SID\$09	INF\$04	9 M11	\$87	\$F1	\$16	\$49	\$04	\$0B	\$00	\$00	\$00	\$00 CS
14230	ECU7	SID\$09	INF\$04	9 M12	\$87	\$F1	\$16	\$49	\$04	\$0C	\$00	\$00	\$00	\$00 CS
14230	ECU7	SID\$09	INF\$04	9 M13	\$87	\$F1	\$16	\$49	\$04	\$0D	\$34	\$37	\$35	\$38 CS
14230	ECU7	SID\$09	INF\$04	9 M14	\$87	\$F1	\$16	\$49	\$04	\$0E	\$39	\$37	\$37	\$35 CS
14230	ECU7	SID\$09	INF\$04	9 M15	\$87	\$F1	\$16	\$49	\$04	\$0F	\$00	\$00	\$00	\$00 CS
14230	ECU7	SID\$09	INF\$04	9 M16	\$87	\$F1	\$16	\$49	\$04	\$10	\$00	\$00	\$00	\$00 CS
14230	ECU7	SID\$09	INF\$04	9 M17	\$87	\$F1	\$16	\$49	\$04	\$11	\$35	\$37	\$35	\$38 CS
14230	ECU7	SID\$09	INF\$04	9 M18	\$87	\$F1	\$16	\$49	\$04	\$12	\$39	\$37	\$37	\$34 CS
14230	ECU7	SID\$09	INF\$04	9 M19	\$87	\$F1	\$16	\$49	\$04	\$13	\$00	\$00	\$00	\$00 CS
14230	ECU7	SID\$09	INF\$04	9 M20	\$87	\$F1	\$16	\$49	\$04	\$14	\$00	\$00	\$00	\$00 CS
14230	ECU7	SID\$09	INF\$04	9 M21	\$87	\$F1	\$16	\$49	\$04	\$15	\$36	\$37	\$35	\$38 CS
14230	ECU7	SID\$09	INF\$04	9 M22	\$87	\$F1	\$16	\$49	\$04	\$16	\$39	\$37	\$37	\$33 CS
14230	ECU7	SID\$09	INF\$04	9 M23	\$87	\$F1	\$16	\$49	\$04	\$17	\$00	\$00	\$00	\$00 CS
14230	ECU7	SID\$09	INF\$04	9 M24	\$87	\$F1	\$16	\$49	\$04	\$18	\$00	\$00	\$00	\$00 CS
14230	ECU7	SID\$09	INF\$04	9 M25	\$87	\$F1	\$16	\$49	\$04	\$19	\$37	\$37	\$35	\$38 CS
14230	ECU7	SID\$09	INF\$04	9 M26	\$87	\$F1	\$16	\$49	\$04	\$1A	\$39	\$37	\$37	\$32 CS
14230	ECU7	SID\$09	INF\$04	9 M26	\$87	\$F1	\$16	\$49	\$04	\$1B	\$00	\$00	\$00	\$00 CS
14230	ECU7	SID\$09	INF\$04	9 M28	\$87	\$F1	\$16	\$49	\$04	\$1C	\$00	\$00	\$00	\$00 CS
14230	ECU7	SID\$09	INF\$04	9 M29	\$87	\$F1	\$16	\$49	\$04	\$1D	\$38	\$37	\$35	\$38 CS
14230	ECU7	SID\$09	INF\$04	9 M30	\$87	\$F1	\$16	\$49	\$04	\$1E	\$39	\$37	\$37	\$31 CS
14230	ECU7	SID\$09	INF\$04	9 M31	\$87	\$F1	\$16	\$49	\$04	\$1F	\$00	\$00	\$00	\$00 CS
14230	ECU7	SID\$09	INF\$04	9 M32	\$87	\$F1	\$16	\$49	\$04	\$20	\$00	\$00	\$00	\$00 CS
14230	ECU7	SID\$09	INF\$04	9 M33	\$87	\$F1	\$16	\$49	\$04	\$21	\$39	\$37	\$35	\$38 CS
14230	ECU7	SID\$09	INF\$04	9 M34	\$87	\$F1	\$16	\$49	\$04	\$22	\$39	\$37	\$37	\$30 CS
14230	ECU7	SID\$09	INF\$04	9 M35	\$87	\$F1	\$16	\$49	\$04	\$23	\$00	\$00	\$00	\$00 CS
14230	ECU7	SID\$09	INF\$04	9 M36	\$87	\$F1	\$16	\$49	\$04	\$24	\$00	\$00	\$00	\$00 CS
14230	ECU7	SID\$09	INF\$05	9	\$83	\$F1	\$16	\$49	\$05	\$09				CS
14230	ECU7	SID\$09	INF\$06	9 M1	\$87	\$F1	\$16	\$49	\$06	\$01	\$77	\$91	\$BC	\$88 CS
14230	ECU7	SID\$09	INF\$06	9 M2	\$87	\$F1	\$16	\$49	\$06	\$02	\$78	\$91	\$BC	\$87 CS
14230	ECU7	SID\$09	INF\$06	9 M3	\$87	\$F1	\$16	\$49	\$06	\$03	\$79	\$91	\$BC	\$86 CS
14230	ECU7	SID\$09	INF\$06	9 M4	\$87	\$F1	\$16	\$49	\$06	\$04	\$7A	\$91	\$BC	\$85 CS
14230	ECU7	SID\$09	INF\$06	9 M5	\$87	\$F1	\$16	\$49	\$06	\$05	\$7B	\$91	\$BC	\$84 CS
14230	ECU7	SID\$09	INF\$06	9 M6	\$87	\$F1	\$16	\$49	\$06	\$06	\$7C	\$91	\$BC	\$83 CS
14230	ECU7	SID\$09	INF\$06	9 M7	\$87	\$F1	\$16	\$49	\$06	\$07	\$7D	\$91	\$BC	\$82 CS
14230	ECU7	SID\$09	INF\$06	9 M8	\$87	\$F1	\$16	\$49	\$06	\$08	\$7E	\$55	\$AA	\$81 CS
14230	ECU7	SID\$09	INF\$06	9 M9	\$87	\$F1	\$16	\$49	\$06	\$09	\$7F	\$FF	\$00	\$80 CS
14230	ECU8	SID\$09	INF\$00		\$86	\$F1	\$17	\$49	\$00	\$3C	\$00	\$00	\$00	CS
14230	ECU8	SID\$09	INF\$03	9	\$83	\$F1	\$17	\$49	\$03	\$24				CS
14230	ECU8	SID\$09	INF\$04	9 M1	\$87	\$F1	\$17	\$49	\$04	\$01	\$31	\$38	\$35	\$38 CS
14230	ECU8	SID\$09	INF\$04	9 M2	\$87	\$F1	\$17	\$49	\$04	\$02	\$39	\$37	\$37	\$38 CS
14230	ECU8	SID\$09	INF\$04	9 M3	\$87	\$F1	\$17	\$49	\$04	\$03	\$00	\$00	\$00	\$00 CS
14230	ECU8	SID\$09	INF\$04	9 M4	\$87	\$F1	\$17	\$49	\$04	\$04	\$00	\$00	\$00	\$00 CS
14230	ECU8	SID\$09	INF\$04	9 M5	\$87	\$F1	\$17	\$49	\$04	\$05	\$32	\$38	\$35	\$38 CS
14230	ECU8	SID\$09	INF\$04	9 M6	\$87	\$F1	\$17	\$49	\$04	\$06	\$39	\$37	\$37	\$37 CS
14230	ECU8	SID\$09	INF\$04	9 M7	\$87	\$F1	\$17	\$49	\$04	\$07	\$00	\$00	\$00	\$00 CS
14230	ECU8	SID\$09	INF\$04	9 M8	\$87	\$F1	\$17	\$49	\$04	\$08	\$00	\$00	\$00	\$00 CS

14230	ECU8	SID\$09	INF\$04	9	M9	\$87	\$F1	\$17	\$49	\$04	\$09	\$33	\$38	\$35	\$38	CS
14230	ECU8	SID\$09	INF\$04	9	M10	\$87	\$F1	\$17	\$49	\$04	\$0A	\$39	\$37	\$37	\$36	CS
14230	ECU8	SID\$09	INF\$04	9	M11	\$87	\$F1	\$17	\$49	\$04	\$0B	\$00	\$00	\$00	\$00	CS
14230	ECU8	SID\$09	INF\$04	9	M12	\$87	\$F1	\$17	\$49	\$04	\$0C	\$00	\$00	\$00	\$00	CS
14230	ECU8	SID\$09	INF\$04	9	M13	\$87	\$F1	\$17	\$49	\$04	\$0D	\$34	\$38	\$35	\$38	CS
14230	ECU8	SID\$09	INF\$04	9	M14	\$87	\$F1	\$17	\$49	\$04	\$0E	\$39	\$37	\$37	\$35	CS
14230	ECU8	SID\$09	INF\$04	9	M15	\$87	\$F1	\$17	\$49	\$04	\$0F	\$00	\$00	\$00	\$00	CS
14230	ECU8	SID\$09	INF\$04	9	M16	\$87	\$F1	\$17	\$49	\$04	\$10	\$00	\$00	\$00	\$00	CS
14230	ECU8	SID\$09	INF\$04	9	M17	\$87	\$F1	\$17	\$49	\$04	\$11	\$35	\$38	\$35	\$38	CS
14230	ECU8	SID\$09	INF\$04	9	M18	\$87	\$F1	\$17	\$49	\$04	\$12	\$39	\$37	\$37	\$34	CS
14230	ECU8	SID\$09	INF\$04	9	M19	\$87	\$F1	\$17	\$49	\$04	\$13	\$00	\$00	\$00	\$00	CS
14230	ECU8	SID\$09	INF\$04	9	M20	\$87	\$F1	\$17	\$49	\$04	\$14	\$00	\$00	\$00	\$00	CS
14230	ECU8	SID\$09	INF\$04	9	M21	\$87	\$F1	\$17	\$49	\$04	\$15	\$36	\$38	\$35	\$38	CS
14230	ECU8	SID\$09	INF\$04	9	M22	\$87	\$F1	\$17	\$49	\$04	\$16	\$39	\$37	\$37	\$33	CS
14230	ECU8	SID\$09	INF\$04	9	M23	\$87	\$F1	\$17	\$49	\$04	\$17	\$00	\$00	\$00	\$00	CS
14230	ECU8	SID\$09	INF\$04	9	M24	\$87	\$F1	\$17	\$49	\$04	\$17	\$00	\$00	\$00	\$00	CS
14230	ECU8	SID\$09	INF\$04	9	M25	\$87	\$F1	\$17	\$49	\$04	\$19	\$37	\$38	\$35	\$38	CS
14230	ECU8	SID\$09	INF\$04	9	M26	\$87	\$F1	\$17	\$49	\$04	\$1A	\$39	\$37	\$37	\$32	CS
14230	ECU8	SID\$09	INF\$04	9	M27	\$87	\$F1	\$17	\$49	\$04	\$1B	\$00	\$00	\$00	\$00	CS
14230	ECU8	SID\$09	INF\$04	9	M28	\$87	\$F1	\$17	\$49	\$04	\$1C	\$00	\$00	\$00	\$00	CS
14230	ECU8	SID\$09	INF\$04	9	M29	\$87	\$F1	\$17	\$49	\$04	\$1D	\$38	\$38	\$35	\$38	CS
14230	ECU8	SID\$09	INF\$04	9	M30	\$87	\$F1	\$17	\$49	\$04	\$1E	\$39	\$37	\$37	\$31	CS
14230	ECU8	SID\$09	INF\$04	9	M31	\$87	\$F1	\$17	\$49	\$04	\$1F	\$00	\$00	\$00	\$00	CS
14230	ECU8	SID\$09	INF\$04	9	M32	\$87	\$F1	\$17	\$49	\$04	\$20	\$00	\$00	\$00	\$00	CS
14230	ECU8	SID\$09	INF\$04	9	M33	\$87	\$F1	\$17	\$49	\$04	\$21	\$39	\$38	\$35	\$38	CS
14230	ECU8	SID\$09	INF\$04	9	M34	\$87	\$F1	\$17	\$49	\$04	\$22	\$39	\$37	\$37	\$30	CS
14230	ECU8	SID\$09	INF\$04	9	M35	\$87	\$F1	\$17	\$49	\$04	\$23	\$00	\$00	\$00	\$00	CS
14230	ECU8	SID\$09	INF\$04	9	M36	\$87	\$F1	\$17	\$49	\$04	\$24	\$00	\$00	\$00	\$00	CS
14230	ECU8	SID\$09	INF\$05	9		\$83	\$F1	\$17	\$49	\$05	\$09					CS
14230	ECU8	SID\$09	INF\$06	9	M1	\$87	\$F1	\$17	\$49	\$06	\$01	\$87	\$91	\$BC	\$88	CS
14230	ECU8	SID\$09	INF\$06	9	M2	\$87	\$F1	\$17	\$49	\$06	\$02	\$88	\$91	\$BC	\$87	CS
14230	ECU8	SID\$09	INF\$06	9	M3	\$87	\$F1	\$17	\$49	\$06	\$03	\$89	\$91	\$BC	\$86	CS
14230	ECU8	SID\$09	INF\$06	9	M4	\$87	\$F1	\$17	\$49	\$06	\$04	\$8A	\$91	\$BC	\$85	CS
14230	ECU8	SID\$09	INF\$06	9	M5	\$87	\$F1	\$17	\$49	\$06	\$05	\$8B	\$91	\$BC	\$84	CS
14230	ECU8	SID\$09	INF\$06	9	M6	\$87	\$F1	\$17	\$49	\$06	\$06	\$8C	\$91	\$BC	\$83	CS
14230	ECU8	SID\$09	INF\$06	9	M7	\$87	\$F1	\$17	\$49	\$06	\$07	\$8D	\$91	\$BC	\$82	CS
14230	ECU8	SID\$09	INF\$06	9	M8	\$87	\$F1	\$17	\$49	\$06	\$08	\$8E	\$55	\$AA	\$81	CS
14230	ECU8	SID\$09	INF\$06	9	M9	\$87	\$F1	\$17	\$49	\$06	\$09	\$8F	\$FF	\$00	\$80	CS

Where CS indicates a correctly computed Checksum as defined by ISO 14230-4.

Figure 12 - Pre-defined messages for ISO 14230-4

5.4.4.4 ISO 14230-4 Message Timing

For convenience, the test cases in this document will use the text in the 'Parameter Reference' column when referring to the specific value, detailed in the 'Value' column of the table below. Unless otherwise specified, the following timing values shall be used:

Parameter Reference	Value
W1_MIN	60 ms
W1	100 ms
W1_MAX	300 ms
W2_MIN	5 ms
W2	15 ms
W2_MAX	20 ms
W3_MIN	0 ms
W3	15 ms
W3_MAX	20 ms
W4_MIN	25 ms
W4	40 ms
W4_MAX	50 ms
W5	At least 300 ms
W5	5 ms
TiniL	24 ms (± 1 ms)
Twup	50 ms (± 1 ms)
P1_MIN	0 ms
P1	5 ms
P1_MAX	20 ms
P2_MIN	0 ms
P2	30 ms
P2_MAX	50 ms
P3_MIN	0 ms
P3	25 ms
P3_MAX	5000 ms
P4_MIN	0 ms
P4	25 ms
P4_MAX	20 ms

Figure 13 - Pre-defined message timing for ISO 14230-4

5.4.4.5 ISO 14230-4 Connected State

The device shall initially be in the 'Power On' state with the K and L Lines connected and the appropriate pull-up applied (as depicted in 5.4.4.1).

5.4.4.6 ISO 14230-4 (2 ECUs) Initialized State

The OBD network shall have determined to be ISO 14230-4 at a baud rate of 10400 with two OBD II ECUs shall have been identified. The DUT may produce a periodic message transmission to keep the network alive. A successful completion of any Section from 8.3.2 to 8.3.9 shall define this state.

5.4.4.7 ISO 14230-4 (8 ECUs) Initialized State

The OBD network shall have determined to be ISO 14230-4 at a baud rate of 10400 with eight OBD II ECUs having been identified. The DUT may produce a periodic message transmission to keep the network alive. A successful completion of 8.3.10 shall define this state.

5.4.4.8 ISO 14230-4 (2 ECUs) SID9 Ready State

The SID \$09 INFOTYPES shall be known for each of the two OBD II ECUs on the network. The DUT may produce a periodic message transmission to keep the network alive. A successful completion of 9.3.17 shall define this state.

5.4.4.9 ISO 14230-4 (2 ECUs) SID9 Diesel Ready State

The SID \$09 INFOTYPES shall be known for each of the two OBD II ECUs on the network. The DUT may produce a periodic message transmission to keep the network alive. A successful completion of 0 shall define this state.

5.4.4.10 ISO 14230-4 (8 ECUs) SID9 Ready State

The SID \$09 INFOTYPES shall be known for each of the eight OBD II ECUs on the network. The DUT may produce a periodic message transmission to keep the network alive. A successful completion of 9.3.19 shall define this state.

5.4.5 ISO 9141-2

5.4.5.1 ISO 9141-2 Electrical Connections

Figure 14 outlines the typical set-up for ISO 9141-2 testing.

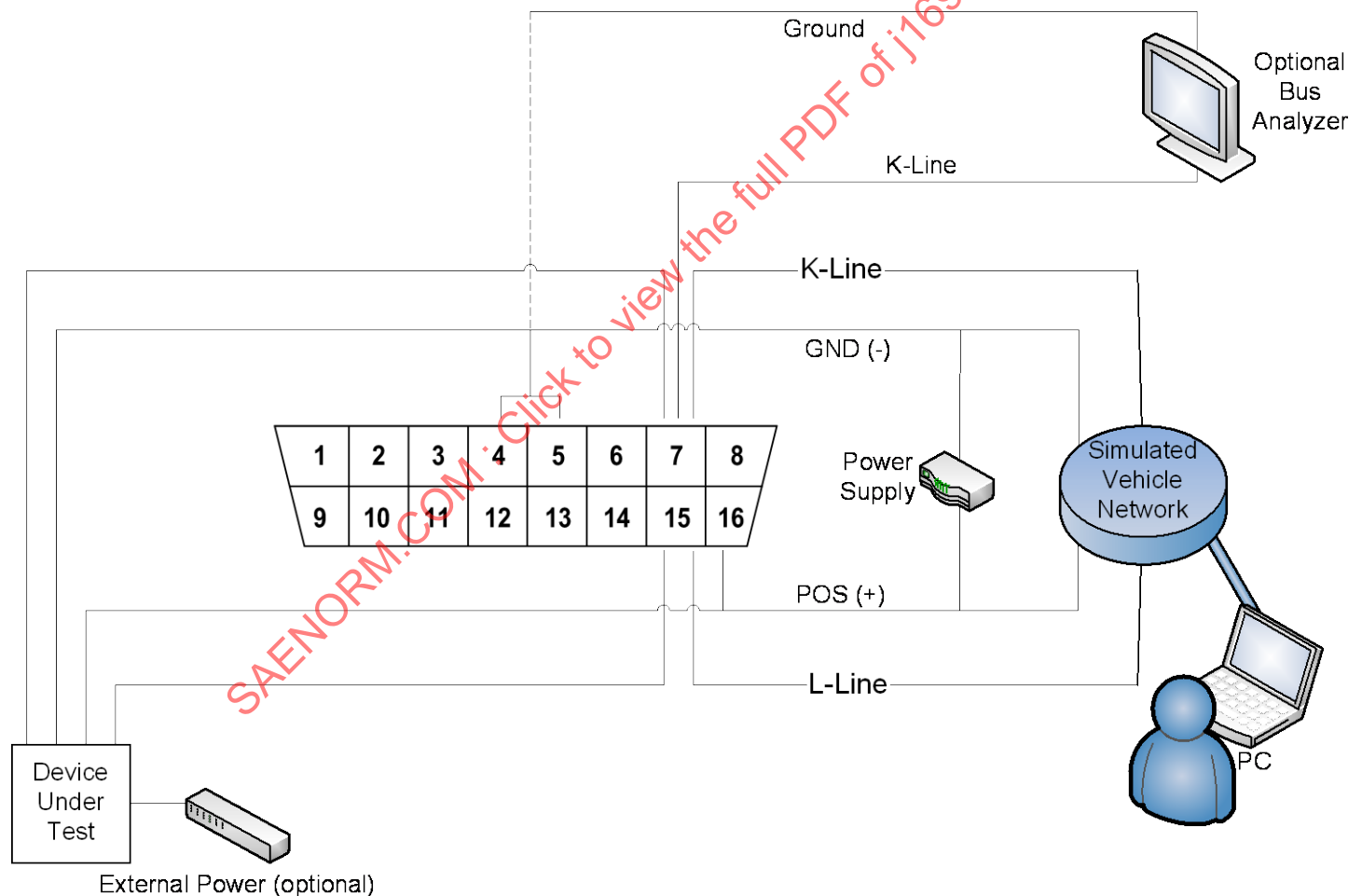


Figure 14 - Test set-up for ISO 9141-2 testing

5.4.5.2 ISO 9141-2 ECU Addresses

The following address bytes have been pre-defined for ISO 9141-2. For convenience, the test cases in this document will use the text in the 'ECU Reference' column when referring to the specific set of address bytes, detailed in the 'Address Bytes' column of the table below.

ECU Reference	Address Bytes
ECU #1	\$10
ECU #2	\$11
ECU #3	\$12
ECU #4	\$13
ECU #5	\$14
ECU #6	\$15
ECU #7	\$16
ECU #8	\$17

Figure 15 - ECU reference and associated addresses for ISO 9141-2

5.4.5.3 ISO 9141-2 Messages

The following messages have been pre-defined for ISO 9141-2. For convenience, the test cases in this document will use the text in the 'Message Reference' column when referring to the specific set of message bytes, detailed in the 'Message Bytes' column of the table below.

Message Reference	Message Bytes
9141_SID\$01_PID\$00	\$68 \$6A \$F1 \$01 \$00 CS
9141_ECU1_SID\$01_PID\$00_BAD	\$48 \$6B \$10 \$72 \$33
9141_ECU1_SID\$01_PID\$00	\$48 \$6B \$10 \$41 \$00 \$80 \$10 \$00 \$00 CS
9141_ECU1_SID\$01_PID\$00	\$48 \$6B \$10 \$41 \$00 \$80 \$10 \$00 \$00 CS
9141_ECU2_SID\$01_PID\$00	\$48 \$6B \$11 \$41 \$00 \$80 \$10 \$00 \$00 CS
9141_ECU3_SID\$01_PID\$00	\$48 \$6B \$12 \$41 \$00 \$00 \$00 \$00 \$00 CS
9141_ECU4_SID\$01_PID\$00	\$48 \$6B \$13 \$41 \$00 \$00 \$00 \$00 \$00 CS
9141_ECU5_SID\$01_PID\$00	\$48 \$6B \$14 \$41 \$00 \$00 \$00 \$00 \$00 CS
9141_ECU6_SID\$01_PID\$00	\$48 \$6B \$15 \$41 \$00 \$00 \$00 \$00 \$00 CS
9141_ECU7_SID\$01_PID\$00	\$48 \$6B \$16 \$41 \$00 \$00 \$00 \$00 \$00 CS
9141_ECU8_SID\$01_PID\$00	\$48 \$6B \$17 \$41 \$00 \$00 \$00 \$00 \$00 CS
9141_SID\$01_PID\$01	\$68 \$6A \$F1 \$01 \$01 CS
9141_SID\$01_PID\$0C	\$68 \$6A \$F1 \$01 \$0C CS
9141_SID\$01_PID\$20	\$68 \$6A \$F1 \$01 \$20 CS
9141_SID\$01_PID\$40	\$68 \$6A \$F1 \$01 \$40 CS
9141_SID\$01_PID\$41	\$68 \$6A \$F1 \$01 \$41 CS
9141_ECU1_SID\$01_PID\$00_20	\$48 \$6B \$10 \$41 \$00 \$80 \$10 \$00 \$01 CS
9141_ECU1_SID\$01_PID\$01_SPARK	\$48 \$6B \$10 \$41 \$01 \$00 \$07 \$EF \$EF CS
9141_ECU1_SID\$01_PID\$01_COMP	\$48 \$6B \$10 \$41 \$01 \$00 \$0F \$EB \$EB CS
9141_ECU1_SID\$01_PID\$0C_KOEO	\$48 \$6B \$10 \$41 \$0C \$00 \$00 CS
9141_ECU1_SID\$01_PID\$20	\$48 \$6B \$10 \$41 \$20 \$00 \$00 \$00 \$01 CS
9141_ECU1_SID\$01_PID\$40	\$48 \$6B \$10 \$41 \$40 \$10 \$00 \$00 \$00 CS
9141_ECU1_SID\$01_PID\$41_SPARK	\$48 \$6B \$10 \$41 \$41 \$00 \$07 \$EF \$EF CS
9141_ECU2_SID\$01_PID\$01_SPARK	\$48 \$6B \$11 \$41 \$01 \$81 \$44 \$00 \$00 CS
9141_ECU2_SID\$01_PID\$01_COMP	\$48 \$6B \$11 \$41 \$01 \$81 \$4C \$00 \$00 CS
9141_ECU2_SID\$01_PID\$0C_KOEO	\$48 \$6B \$11 \$41 \$0C \$00 \$00 CS
9141_SID\$02_PID\$02	\$68 \$6A \$F1 \$02 \$02 \$00 CS
9141_ECU1_SID\$02_PID\$02_NoDTC	\$48 \$6B \$10 \$42 \$02 \$00 \$00 \$00 CS
9141_ECU2_SID\$02_PID\$02_NoDTC	\$48 \$6B \$11 \$42 \$02 \$00 \$00 \$00 CS
9141_ECU1_SID\$02_PID\$02_DTC	\$48 \$6B \$10 \$42 \$02 \$00 \$01 \$07 CS
9141_SID\$03	\$68 \$6A \$F1 \$03 CS
9141_ECU1_SID\$03_NoDTC	\$48 \$6B \$10 \$43 \$00 CS
9141_ECU1_SID\$03_DTC_M1	\$48 \$6B \$10 \$43 \$01 \$07 \$01 \$10 \$01 \$15 CS
9141_ECU1_SID\$03_DTC_M2	\$48 \$6B \$10 \$43 \$01 \$24 \$00 \$00 \$00 \$00 CS

9141 ECU2 SID\$03_NoDTC	\$48 \$6B \$11 \$43 \$00 CS
9141 SID\$04	\$68 \$6A \$F1 \$04CS
9141 ECU1 SID\$04_DONE	\$48 \$6B \$10 \$44 CS
9141 ECU1 SID\$04_NRC22	\$48 \$6B \$10 \$7F \$44 \$22 CS
9141 ECU1 SID\$04_NRC78	\$48 \$6B \$10 \$7F \$44 \$78 CS
9141 ECU2 SID\$04_DONE	\$48 \$6B \$11 \$44 CS
9141 ECU2 SID\$04_NRC22	\$48 \$6B \$11 \$7F \$44 \$22 CS
9141 SID\$05_TID\$01	\$68 \$6A \$F1 \$05 \$01 \$02 CS
9141 ECU1 SID\$05_TID\$01	\$48 \$6B \$10 \$45 \$01 \$02 \$00 \$5A CS
9141 SID\$06_MID\$00	\$68 \$6A \$F1 \$06 \$00 CS
9141 ECU1 SID\$06_MID\$00	\$48 \$6B \$10 \$46 \$00 \$CC \$00 \$00 \$00 CS
9141 SID\$07	\$68 \$6A \$F1 \$07 CS
9141 ECU1 SID\$07_NoDTC	\$48 \$6B \$10 \$47 \$00 CS
9141 ECU1 SID\$07_DTC_M1	\$48 \$6B \$10 \$47 \$01 \$07 \$01 \$10 \$01 \$15 CS
9141 ECU1 SID\$07_DTC_M2	\$48 \$6B \$10 \$47 \$01 \$24 \$00 \$00 \$00 \$00 CS
9141 ECU2 SID\$07_NoDTC	\$48 \$6B \$11 \$47 \$00 CS
9141 SID\$08_TID\$00	\$68 \$6A \$F1 \$08 CS
9141 ECU1 SID\$08_TID\$00	\$48 \$6B \$10 \$48 \$00 \$80 \$00 \$00 \$00 CS
9141 SID\$09_INF\$00	\$68 \$6A \$F1 \$09 \$00 CS
9141 SID\$09_INF\$01	\$68 \$6A \$F1 \$09 \$01 CS
9141 SID\$09_INF\$02	\$68 \$6A \$F1 \$09 \$02 CS
9141 SID\$09_INF\$03	\$68 \$6A \$F1 \$09 \$03 CS
9141 SID\$09_INF\$04	\$68 \$6A \$F1 \$09 \$04 CS
9141 SID\$09_INF\$05	\$68 \$6A \$F1 \$09 \$05 CS
9141 SID\$09_INF\$06	\$68 \$6A \$F1 \$09 \$06 CS
9141 SID\$09_INF\$07	\$68 \$6A \$F1 \$09 \$07 CS
9141 SID\$09_INF\$08	\$68 \$6A \$F1 \$09 \$08 CS
9141 SID\$09_INF\$0B	\$68 \$6A \$F1 \$09 \$0B CS
9141 ECU1 SID\$09_INF\$00	\$48 \$6B \$10 \$49 \$00 \$FF \$00 \$00 \$00 CS
9141 ECU1 SID\$09_INF\$00_DIESEL	\$48 \$6B \$10 \$49 \$00 \$FE \$20 \$00 \$00 CS
9141 ECU1 SID\$09_INF\$01	\$48 \$6B \$10 \$49 \$01 \$05 CS
9141 ECU1 SID\$09_INF\$02_M1	\$48 \$6B \$10 \$49 \$02 \$01 \$00 \$00 \$00 \$31 CS
9141 ECU1 SID\$09_INF\$02_M2	\$48 \$6B \$10 \$49 \$02 \$02 \$47 \$59 \$44 \$45 CS
9141 ECU1 SID\$09_INF\$02_M3	\$48 \$6B \$10 \$49 \$02 \$03 \$36 \$33 \$41 \$37 CS
9141 ECU1 SID\$09_INF\$02_M4	\$48 \$6B \$10 \$49 \$02 \$04 \$41 \$30 \$30 \$30 CS
9141 ECU1 SID\$09_INF\$02_M5	\$48 \$6B \$10 \$49 \$02 \$05 \$30 \$30 \$30 \$30 CS
9141 ECU1 SID\$09_INF\$03	\$48 \$6B \$10 \$49 \$03 \$04 CS
9141 ECU1 SID\$09_INF\$03_9	\$48 \$6B \$10 \$49 \$03 \$24 CS
9141 ECU1 SID\$09_INF\$04_M1	\$48 \$6B \$10 \$49 \$04 \$01 \$31 \$32 \$35 \$38 CS
9141 ECU1 SID\$09_INF\$04_M2	\$48 \$6B \$10 \$49 \$04 \$02 \$39 \$37 \$37 \$32 CS
9141 ECU1 SID\$09_INF\$04_M3	\$48 \$6B \$10 \$49 \$04 \$03 \$00 \$00 \$00 \$00 CS
9141 ECU1 SID\$09_INF\$04_M4	\$48 \$6B \$10 \$49 \$04 \$04 \$00 \$00 \$00 \$00 CS
9141 ECU1 SID\$09_INF\$04_9_M1	\$48 \$6B \$10 \$49 \$04 \$01 \$31 \$31 \$35 \$38 CS
9141 ECU1 SID\$09_INF\$04_9_M2	\$48 \$6B \$10 \$49 \$04 \$02 \$39 \$37 \$37 \$38 CS
9141 ECU1 SID\$09_INF\$04_9_M3	\$48 \$6B \$10 \$49 \$04 \$03 \$00 \$00 \$00 \$00 CS
9141 ECU1 SID\$09_INF\$04_9_M4	\$48 \$6B \$10 \$49 \$04 \$04 \$00 \$00 \$00 \$00 CS
9141 ECU1 SID\$09_INF\$04_9_M5	\$48 \$6B \$10 \$49 \$04 \$05 \$32 \$31 \$35 \$38 CS
9141 ECU1 SID\$09_INF\$04_9_M6	\$48 \$6B \$10 \$49 \$04 \$06 \$39 \$37 \$37 \$37 CS
9141 ECU1 SID\$09_INF\$04_9_M7	\$48 \$6B \$10 \$49 \$04 \$07 \$00 \$00 \$00 \$00 CS
9141 ECU1 SID\$09_INF\$04_9_M8	\$48 \$6B \$10 \$49 \$04 \$08 \$00 \$00 \$00 \$00 CS
9141 ECU1 SID\$09_INF\$04_9_M9	\$48 \$6B \$10 \$49 \$04 \$09 \$33 \$31 \$35 \$38 CS
9141 ECU1 SID\$09_INF\$04_9_M10	\$48 \$6B \$10 \$49 \$04 \$0A \$39 \$37 \$37 \$36 CS
9141 ECU1 SID\$09_INF\$04_9_M11	\$48 \$6B \$10 \$49 \$04 \$0B \$00 \$00 \$00 \$00 CS
9141 ECU1 SID\$09_INF\$04_9_M12	\$48 \$6B \$10 \$49 \$04 \$0C \$00 \$00 \$00 \$00 CS
9141 ECU1 SID\$09_INF\$04_9_M13	\$48 \$6B \$10 \$49 \$04 \$0D \$34 \$31 \$35 \$38 CS
9141 ECU1 SID\$09_INF\$04_9_M14	\$48 \$6B \$10 \$49 \$04 \$0E \$39 \$37 \$37 \$35 CS
9141 ECU1 SID\$09_INF\$04_9_M15	\$48 \$6B \$10 \$49 \$04 \$0F \$00 \$00 \$00 \$00 CS
9141 ECU1 SID\$09_INF\$04_9_M16	\$48 \$6B \$10 \$49 \$04 \$10 \$00 \$00 \$00 \$00 CS

9141 ECU1 SID\$09 INF\$04 9 M17	\$48 \$6B \$10 \$49 \$04 \$11 \$35 \$31 \$35 \$38 CS
9141 ECU1 SID\$09 INF\$04 9 M18	\$48 \$6B \$10 \$49 \$04 \$12 \$39 \$37 \$37 \$34 CS
9141 ECU1 SID\$09 INF\$04 9 M19	\$48 \$6B \$10 \$49 \$04 \$13 \$00 \$00 \$00 \$00 CS
9141 ECU1 SID\$09 INF\$04 9 M20	\$48 \$6B \$10 \$49 \$04 \$14 \$00 \$00 \$00 \$00 CS
9141 ECU1 SID\$09 INF\$04 9 M21	\$48 \$6B \$10 \$49 \$04 \$15 \$36 \$31 \$35 \$38 CS
9141 ECU1 SID\$09 INF\$04 9 M22	\$48 \$6B \$10 \$49 \$04 \$16 \$39 \$37 \$37 \$33 CS
9141 ECU1 SID\$09 INF\$04 9 M23	\$48 \$6B \$10 \$49 \$04 \$17 \$00 \$00 \$00 \$00 CS
9141 ECU1 SID\$09 INF\$04 9 M24	\$48 \$6B \$10 \$49 \$04 \$18 \$00 \$00 \$00 \$00 CS
9141 ECU1 SID\$09 INF\$04 9 M25	\$48 \$6B \$10 \$49 \$04 \$19 \$37 \$31 \$35 \$38 CS
9141 ECU1 SID\$09 INF\$04 9 M26	\$48 \$6B \$10 \$49 \$04 \$1A \$39 \$37 \$37 \$32 CS
9141 ECU1 SID\$09 INF\$04 9 M27	\$48 \$6B \$10 \$49 \$04 \$1B \$00 \$00 \$00 \$00 CS
9141 ECU1 SID\$09 INF\$04 9 M28	\$48 \$6B \$10 \$49 \$04 \$1C \$00 \$00 \$00 \$00 CS
9141 ECU1 SID\$09 INF\$04 9 M29	\$48 \$6B \$10 \$49 \$04 \$1D \$38 \$31 \$35 \$38 CS
9141 ECU1 SID\$09 INF\$04 9 M30	\$48 \$6B \$10 \$49 \$04 \$1E \$39 \$37 \$37 \$31 CS
9141 ECU1 SID\$09 INF\$04 9 M31	\$48 \$6B \$10 \$49 \$04 \$1F \$00 \$00 \$00 \$00 CS
9141 ECU1 SID\$09 INF\$04 9 M32	\$48 \$6B \$10 \$49 \$04 \$20 \$00 \$00 \$00 \$00 CS
9141 ECU1 SID\$09 INF\$04 9 M33	\$48 \$6B \$10 \$49 \$04 \$21 \$39 \$31 \$35 \$38 CS
9141 ECU1 SID\$09 INF\$04 9 M34	\$48 \$6B \$10 \$49 \$04 \$22 \$39 \$37 \$37 \$30 CS
9141 ECU1 SID\$09 INF\$04 9 M35	\$48 \$6B \$10 \$49 \$04 \$23 \$00 \$00 \$00 \$00 CS
9141 ECU1 SID\$09 INF\$04 9 M36	\$48 \$6B \$10 \$49 \$04 \$24 \$00 \$00 \$00 \$00 CS
9141 ECU1 SID\$09 INF\$05	\$48 \$6B \$10 \$49 \$05 \$01 CS
9141 ECU1 SID\$09 INF\$05 9	\$48 \$6B \$10 \$49 \$05 \$09 CS
9141 ECU1 SID\$09 INF\$06	\$48 \$6B \$10 \$49 \$06 \$01 \$17 \$91 \$BC \$88 CS
9141 ECU1 SID\$09 INF\$06 9 M1	\$48 \$6B \$10 \$49 \$06 \$01 \$17 \$91 \$BC \$88 CS
9141 ECU1 SID\$09 INF\$06 9 M2	\$48 \$6B \$10 \$49 \$06 \$02 \$18 \$91 \$BC \$87 CS
9141 ECU1 SID\$09 INF\$06 9 M3	\$48 \$6B \$10 \$49 \$06 \$03 \$19 \$91 \$BC \$86 CS
9141 ECU1 SID\$09 INF\$06 9 M4	\$48 \$6B \$10 \$49 \$06 \$04 \$1A \$91 \$BC \$85 CS
9141 ECU1 SID\$09 INF\$06 9 M5	\$48 \$6B \$10 \$49 \$06 \$05 \$1B \$91 \$BC \$84 CS
9141 ECU1 SID\$09 INF\$06 9 M6	\$48 \$6B \$10 \$49 \$06 \$06 \$1C \$91 \$BC \$83 CS
9141 ECU1 SID\$09 INF\$06 9 M7	\$48 \$6B \$10 \$49 \$06 \$07 \$1D \$91 \$BC \$82 CS
9141 ECU1 SID\$09 INF\$06 9 M8	\$48 \$6B \$10 \$49 \$06 \$08 \$1E \$55 \$AA \$81 CS
9141 ECU1 SID\$09 INF\$06 9 M9	\$48 \$6B \$10 \$49 \$06 \$09 \$1F \$FF \$00 \$80 CS
9141 ECU1 SID\$09 INF\$07 832	\$48 \$6B \$10 \$49 \$07 \$08 CS
9141 ECU1 SID\$09 INF\$07 840	\$48 \$6B \$10 \$49 \$07 \$0A CS
9141 ECU1 SID\$09 INF\$07 B32	\$48 \$6B \$10 \$49 \$07 \$08 CS
9141 ECU1 SID\$09 INF\$07 B36	\$48 \$6B \$10 \$49 \$07 \$09 CS
9141 ECU1 SID\$09 INF\$08 32 M1	\$48 \$6B \$10 \$49 \$08 \$01 \$00 \$64 \$00 \$69 CS
9141 ECU1 SID\$09 INF\$08 32 M2	\$48 \$6B \$10 \$49 \$08 \$02 \$00 \$0A \$00 \$0F CS
9141 ECU1 SID\$09 INF\$08 32 M3	\$48 \$6B \$10 \$49 \$08 \$03 \$00 \$00 \$00 \$00 CS
9141 ECU1 SID\$09 INF\$08 32 M4	\$48 \$6B \$10 \$49 \$08 \$04 \$00 \$1E \$00 \$23 CS
9141 ECU1 SID\$09 INF\$08 32 M5	\$48 \$6B \$10 \$49 \$08 \$05 \$00 \$00 \$00 \$00 CS
9141 ECU1 SID\$09 INF\$08 32 M6	\$48 \$6B \$10 \$49 \$08 \$06 \$00 \$32 \$00 \$37 CS
9141 ECU1 SID\$09 INF\$08 32 M7	\$48 \$6B \$10 \$49 \$08 \$07 \$00 \$3C \$00 \$41 CS
9141 ECU1 SID\$09 INF\$08 32 M8	\$48 \$6B \$10 \$49 \$08 \$08 \$00 \$46 \$00 \$4B CS
9141 ECU1 SID\$09 INF\$08 40 M1	\$48 \$6B \$10 \$49 \$08 \$01 \$00 \$64 \$00 \$69 CS
9141 ECU1 SID\$09 INF\$08 40 M2	\$48 \$6B \$10 \$49 \$08 \$02 \$00 \$0A \$00 \$0F CS
9141 ECU1 SID\$09 INF\$08 40 M3	\$48 \$6B \$10 \$49 \$08 \$03 \$00 \$00 \$00 \$00 CS
9141 ECU1 SID\$09 INF\$08 40 M4	\$48 \$6B \$10 \$49 \$08 \$04 \$00 \$1E \$00 \$23 CS
9141 ECU1 SID\$09 INF\$08 40 M5	\$48 \$6B \$10 \$49 \$08 \$05 \$00 \$00 \$00 \$00 CS
9141 ECU1 SID\$09 INF\$08 40 M6	\$48 \$6B \$10 \$49 \$08 \$06 \$00 \$32 \$00 \$37 CS
9141 ECU1 SID\$09 INF\$08 40 M7	\$48 \$6B \$10 \$49 \$08 \$07 \$00 \$3C \$00 \$41 CS
9141 ECU1 SID\$09 INF\$08 40 M8	\$48 \$6B \$10 \$49 \$08 \$08 \$00 \$46 \$00 \$4B CS
9141 ECU1 SID\$09 INF\$08 40 M9	\$48 \$6B \$10 \$49 \$08 \$09 \$00 \$5A \$00 \$5F CS
9141 ECU1 SID\$09 INF\$08 40 M10	\$48 \$6B \$10 \$49 \$08 \$0A \$00 \$00 \$00 \$00 CS
9141 ECU1 SID\$09 INF\$0B 32 M1	\$48 \$6B \$10 \$49 \$0B \$01 \$00 \$64 \$00 \$69 CS
9141 ECU1 SID\$09 INF\$0B 32 M2	\$48 \$6B \$10 \$49 \$0B \$02 \$00 \$0A \$00 \$0F CS
9141 ECU1 SID\$09 INF\$0B 32 M3	\$48 \$6B \$10 \$49 \$0B \$03 \$00 \$00 \$00 \$00 CS
9141 ECU1 SID\$09 INF\$0B 32 M4	\$48 \$6B \$10 \$49 \$0B \$04 \$00 \$00 \$00 \$00 CS

9141	ECU1	SID\$09	INF\$0B	32	M5	\$48	\$6B	\$10	\$49	\$0B	\$05	\$00	\$00	\$00	\$00	CS
9141	ECU1	SID\$09	INF\$0B	32	M6	\$48	\$6B	\$10	\$49	\$0B	\$06	\$00	\$32	\$00	\$37	CS
9141	ECU1	SID\$09	INF\$0B	32	M7	\$48	\$6B	\$10	\$49	\$0B	\$07	\$00	\$3C	\$00	\$41	CS
9141	ECU1	SID\$09	INF\$0B	32	M8	\$48	\$6B	\$10	\$49	\$0B	\$08	\$00	\$46	\$00	\$4B	CS
9141	ECU1	SID\$09	INF\$0B	36	M1	\$48	\$6B	\$10	\$49	\$0B	\$01	\$00	\$64	\$00	\$69	CS
9141	ECU1	SID\$09	INF\$0B	36	M2	\$48	\$6B	\$10	\$49	\$0B	\$02	\$00	\$0A	\$00	\$0F	CS
9141	ECU1	SID\$09	INF\$0B	36	M3	\$48	\$6B	\$10	\$49	\$0B	\$03	\$00	\$00	\$00	\$00	CS
9141	ECU1	SID\$09	INF\$0B	36	M4	\$48	\$6B	\$10	\$49	\$0B	\$04	\$00	\$00	\$00	\$00	CS
9141	ECU1	SID\$09	INF\$0B	36	M5	\$48	\$6B	\$10	\$49	\$0B	\$05	\$00	\$00	\$00	\$00	CS
9141	ECU1	SID\$09	INF\$0B	36	M6	\$48	\$6B	\$10	\$49	\$0B	\$06	\$00	\$32	\$00	\$37	CS
9141	ECU1	SID\$09	INF\$0B	36	M7	\$48	\$6B	\$10	\$49	\$0B	\$07	\$00	\$3C	\$00	\$41	CS
9141	ECU1	SID\$09	INF\$0B	36	M8	\$48	\$6B	\$10	\$49	\$0B	\$08	\$00	\$46	\$00	\$4B	CS
9141	ECU1	SID\$09	INF\$0B	36	M9	\$48	\$6B	\$10	\$49	\$0B	\$09	\$00	\$50	\$00	\$55	CS
9141	ECU1	SID\$09	NRC78			\$48	\$6B	\$10	\$7F	\$49	\$78					CS
9141	ECU2	SID\$09	INF\$00			\$48	\$6B	\$11	\$49	\$00	\$3F	\$00	\$00	\$00	\$00	CS
9141	ECU2	SID\$09	INF\$00		DIESEL	\$48	\$6B	\$11	\$49	\$00	\$3E	\$20	\$00	\$00	\$00	CS
9141	ECU2	SID\$09	INF\$03			\$48	\$6B	\$11	\$49	\$03	\$04					CS
9141	ECU2	SID\$09	INF\$03	9		\$48	\$6B	\$11	\$49	\$03	\$24					CS
9141	ECU2	SID\$09	INF\$04	M1		\$48	\$6B	\$11	\$49	\$04	\$01	\$32	\$34	\$32	\$32	CS
9141	ECU2	SID\$09	INF\$04	M2		\$48	\$6B	\$11	\$49	\$04	\$02	\$31	\$34	\$31	\$39	CS
9141	ECU2	SID\$09	INF\$04	M3		\$48	\$6B	\$11	\$49	\$04	\$03	\$00	\$00	\$00	\$00	CS
9141	ECU2	SID\$09	INF\$04	M4		\$48	\$6B	\$11	\$49	\$04	\$04	\$00	\$00	\$00	\$00	CS
9141	ECU2	SID\$09	INF\$04	9	M1	\$48	\$6B	\$11	\$49	\$04	\$01	\$31	\$32	\$35	\$38	CS
9141	ECU2	SID\$09	INF\$04	9	M2	\$48	\$6B	\$11	\$49	\$04	\$02	\$39	\$37	\$37	\$38	CS
9141	ECU2	SID\$09	INF\$04	9	M3	\$48	\$6B	\$11	\$49	\$04	\$03	\$00	\$00	\$00	\$00	CS
9141	ECU2	SID\$09	INF\$04	9	M4	\$48	\$6B	\$11	\$49	\$04	\$04	\$00	\$00	\$00	\$00	CS
9141	ECU2	SID\$09	INF\$04	9	M5	\$48	\$6B	\$11	\$49	\$04	\$05	\$32	\$32	\$35	\$38	CS
9141	ECU2	SID\$09	INF\$04	9	M6	\$48	\$6B	\$11	\$49	\$04	\$06	\$39	\$37	\$37	\$37	CS
9141	ECU2	SID\$09	INF\$04	9	M7	\$48	\$6B	\$11	\$49	\$04	\$07	\$00	\$00	\$00	\$00	CS
9141	ECU2	SID\$09	INF\$04	9	M8	\$48	\$6B	\$11	\$49	\$04	\$08	\$00	\$00	\$00	\$00	CS
9141	ECU2	SID\$09	INF\$04	9	M9	\$48	\$6B	\$11	\$49	\$04	\$09	\$33	\$32	\$35	\$38	CS
9141	ECU2	SID\$09	INF\$04	9	M10	\$48	\$6B	\$11	\$49	\$04	\$0A	\$39	\$37	\$37	\$36	CS
9141	ECU2	SID\$09	INF\$04	9	M11	\$48	\$6B	\$11	\$49	\$04	\$0B	\$00	\$00	\$00	\$00	CS
9141	ECU2	SID\$09	INF\$04	9	M12	\$48	\$6B	\$11	\$49	\$04	\$0C	\$00	\$00	\$00	\$00	CS
9141	ECU2	SID\$09	INF\$04	9	M13	\$48	\$6B	\$11	\$49	\$04	\$0D	\$34	\$32	\$35	\$38	CS
9141	ECU2	SID\$09	INF\$04	9	M14	\$48	\$6B	\$11	\$49	\$04	\$0E	\$39	\$37	\$37	\$35	CS
9141	ECU2	SID\$09	INF\$04	9	M15	\$48	\$6B	\$11	\$49	\$04	\$0F	\$00	\$00	\$00	\$00	CS
9141	ECU2	SID\$09	INF\$04	9	M16	\$48	\$6B	\$11	\$49	\$04	\$10	\$00	\$00	\$00	\$00	CS
9141	ECU2	SID\$09	INF\$04	9	M17	\$48	\$6B	\$11	\$49	\$04	\$11	\$35	\$32	\$35	\$38	CS
9141	ECU2	SID\$09	INF\$04	9	M18	\$48	\$6B	\$11	\$49	\$04	\$12	\$39	\$37	\$37	\$34	CS
9141	ECU2	SID\$09	INF\$04	9	M19	\$48	\$6B	\$11	\$49	\$04	\$13	\$00	\$00	\$00	\$00	CS
9141	ECU2	SID\$09	INF\$04	9	M20	\$48	\$6B	\$11	\$49	\$04	\$14	\$00	\$00	\$00	\$00	CS
9141	ECU2	SID\$09	INF\$04	9	M21	\$48	\$6B	\$11	\$49	\$04	\$15	\$36	\$32	\$35	\$38	CS
9141	ECU2	SID\$09	INF\$04	9	M22	\$48	\$6B	\$11	\$49	\$04	\$16	\$39	\$37	\$37	\$33	CS
9141	ECU2	SID\$09	INF\$04	9	M23	\$48	\$6B	\$11	\$49	\$04	\$17	\$00	\$00	\$00	\$00	CS
9141	ECU2	SID\$09	INF\$04	9	M24	\$48	\$6B	\$11	\$49	\$04	\$18	\$00	\$00	\$00	\$00	CS
9141	ECU2	SID\$09	INF\$04	9	M25	\$48	\$6B	\$11	\$49	\$04	\$19	\$37	\$32	\$35	\$38	CS
9141	ECU2	SID\$09	INF\$04	9	M26	\$48	\$6B	\$11	\$49	\$04	\$1A	\$39	\$37	\$37	\$32	CS
9141	ECU2	SID\$09	INF\$04	9	M27	\$48	\$6B	\$11	\$49	\$04	\$1B	\$00	\$00	\$00	\$00	CS
9141	ECU2	SID\$09	INF\$04	9	M28	\$48	\$6B	\$11	\$49	\$04	\$1C	\$00	\$00	\$00	\$00	CS
9141	ECU2	SID\$09	INF\$04	9	M29	\$48	\$6B	\$11	\$49	\$04	\$1D	\$38	\$32	\$35	\$38	CS
9141	ECU2	SID\$09	INF\$04	9	M30	\$48	\$6B	\$11	\$49	\$04	\$1E	\$39	\$37	\$37	\$31	CS
9141	ECU2	SID\$09	INF\$04	9	M31	\$48	\$6B	\$11	\$49	\$04	\$1F	\$00	\$00	\$00	\$00	CS
9141	ECU2	SID\$09	INF\$04	9	M32	\$48	\$6B	\$11	\$49	\$04	\$20	\$00	\$00	\$00	\$00	CS
9141	ECU2	SID\$09	INF\$04	9	M33	\$48	\$6B	\$11	\$49	\$04	\$21	\$39	\$32	\$35	\$38	CS
9141	ECU2	SID\$09	INF\$04	9	M34	\$48	\$6B	\$11	\$49	\$04	\$22	\$39	\$37	\$37	\$30	CS
9141	ECU2	SID\$09	INF\$04	9	M35	\$48	\$6B	\$11	\$49	\$04	\$23	\$00	\$00	\$00	\$00	CS
9141	ECU2	SID\$09	INF\$04	9	M36	\$48	\$6B	\$11	\$49	\$04	\$24	\$00	\$00	\$00	\$00	CS

9141	ECU2	SID\$09	INF\$05		\$48 \$6B \$11 \$49 \$05 \$01 CS
9141	ECU2	SID\$09	INF\$05 9		\$48 \$6B \$11 \$49 \$05 \$09 CS
9141	ECU1	SID\$09	INF\$06		\$48 \$6B \$11 \$49 \$06 \$01 \$27 \$91 \$BC \$88 CS
9141	ECU2	SID\$09	INF\$06 9 M1		\$48 \$6B \$11 \$49 \$06 \$01 \$27 \$91 \$BC \$88 CS
9141	ECU2	SID\$09	INF\$06 9 M2		\$48 \$6B \$11 \$49 \$06 \$02 \$28 \$91 \$BC \$87 CS
9141	ECU2	SID\$09	INF\$06 9 M3		\$48 \$6B \$11 \$49 \$06 \$03 \$29 \$91 \$BC \$86 CS
9141	ECU2	SID\$09	INF\$06 9 M4		\$48 \$6B \$11 \$49 \$06 \$04 \$2A \$91 \$BC \$85 CS
9141	ECU2	SID\$09	INF\$06 9 M5		\$48 \$6B \$11 \$49 \$06 \$05 \$2B \$91 \$BC \$84 CS
9141	ECU2	SID\$09	INF\$06 9 M6		\$48 \$6B \$11 \$49 \$06 \$06 \$2C \$91 \$BC \$83 CS
9141	ECU2	SID\$09	INF\$06 9 M7		\$48 \$6B \$11 \$49 \$06 \$07 \$2D \$91 \$BC \$82 CS
9141	ECU2	SID\$09	INF\$06 9 M8		\$48 \$6B \$11 \$49 \$06 \$08 \$2E \$55 \$AA \$81 CS
9141	ECU2	SID\$09	INF\$06 9 M9		\$48 \$6B \$11 \$49 \$06 \$09 \$2F \$FF \$00 \$80 CS
9141	ECU2	SID\$09	INF\$07 832		\$48 \$6B \$11 \$49 \$07 \$08 CS
9141	ECU2	SID\$09	INF\$07 840		\$48 \$6B \$11 \$49 \$07 \$0A CS
9141	ECU2	SID\$09	INF\$07 B32		\$48 \$6B \$11 \$49 \$07 \$08 CS
9141	ECU2	SID\$09	INF\$07 B36		\$48 \$6B \$11 \$49 \$07 \$09 CS
9141	ECU2	SID\$09	INF\$08 32 M1		\$48 \$6B \$11 \$49 \$08 \$01 \$00 \$64 \$00 \$69 CS
9141	ECU2	SID\$09	INF\$08 32 M2		\$48 \$6B \$11 \$49 \$08 \$02 \$00 \$00 \$00 \$00 CS
9141	ECU2	SID\$09	INF\$08 32 M3		\$48 \$6B \$11 \$49 \$08 \$03 \$00 \$14 \$00 \$19 CS
9141	ECU2	SID\$09	INF\$08 32 M4		\$48 \$6B \$11 \$49 \$08 \$04 \$00 \$00 \$00 \$00 CS
9141	ECU2	SID\$09	INF\$08 32 M5		\$48 \$6B \$11 \$49 \$08 \$05 \$00 \$28 \$00 \$2D CS
9141	ECU2	SID\$09	INF\$08 32 M6		\$48 \$6B \$11 \$49 \$08 \$06 \$00 \$00 \$00 \$00 CS
9141	ECU2	SID\$09	INF\$08 32 M7		\$48 \$6B \$11 \$49 \$08 \$07 \$00 \$00 \$00 \$00 CS
9141	ECU2	SID\$09	INF\$08 32 M8		\$48 \$6B \$11 \$49 \$08 \$08 \$00 \$00 \$00 \$00 CS
9141	ECU2	SID\$09	INF\$08 40 M1		\$48 \$6B \$11 \$49 \$08 \$01 \$00 \$64 \$00 \$69 CS
9141	ECU2	SID\$09	INF\$08 40 M2		\$48 \$6B \$11 \$49 \$08 \$02 \$00 \$00 \$00 \$00 CS
9141	ECU2	SID\$09	INF\$08 40 M3		\$48 \$6B \$11 \$49 \$08 \$03 \$00 \$14 \$00 \$19 CS
9141	ECU2	SID\$09	INF\$08 40 M4		\$48 \$6B \$11 \$49 \$08 \$04 \$00 \$00 \$00 \$00 CS
9141	ECU2	SID\$09	INF\$08 40 M5		\$48 \$6B \$11 \$49 \$08 \$05 \$00 \$28 \$00 \$2D CS
9141	ECU2	SID\$09	INF\$08 40 M6		\$48 \$6B \$11 \$49 \$08 \$06 \$00 \$00 \$00 \$00 CS
9141	ECU2	SID\$09	INF\$08 40 M7		\$48 \$6B \$11 \$49 \$08 \$07 \$00 \$00 \$00 \$00 CS
9141	ECU2	SID\$09	INF\$08 40 M8		\$48 \$6B \$11 \$49 \$08 \$08 \$00 \$00 \$00 \$00 CS
9141	ECU2	SID\$09	INF\$08 40 M9		\$48 \$6B \$11 \$49 \$08 \$09 \$00 \$00 \$00 \$00 CS
9141	ECU2	SID\$09	INF\$08 40 M10		\$48 \$6B \$11 \$49 \$08 \$0A \$00 \$5A \$00 \$5F CS
9141	ECU2	SID\$09	INF\$0B 32 M1		\$48 \$6B \$11 \$49 \$0B \$01 \$00 \$64 \$00 \$69 CS
9141	ECU2	SID\$09	INF\$0B 32 M2		\$48 \$6B \$11 \$49 \$0B \$02 \$00 \$00 \$00 \$00 CS
9141	ECU2	SID\$09	INF\$0B 32 M3		\$48 \$6B \$11 \$49 \$0B \$03 \$00 \$14 \$00 \$19 CS
9141	ECU2	SID\$09	INF\$0B 32 M4		\$48 \$6B \$11 \$49 \$0B \$04 \$00 \$00 \$00 \$00 CS
9141	ECU2	SID\$09	INF\$0B 32 M5		\$48 \$6B \$11 \$49 \$0B \$05 \$00 \$28 \$00 \$2D CS
9141	ECU2	SID\$09	INF\$0B 32 M6		\$48 \$6B \$11 \$49 \$0B \$06 \$00 \$00 \$00 \$00 CS
9141	ECU2	SID\$09	INF\$0B 32 M7		\$48 \$6B \$11 \$49 \$0B \$07 \$00 \$00 \$00 \$00 CS
9141	ECU2	SID\$09	INF\$0B 32 M8		\$48 \$6B \$11 \$49 \$0B \$08 \$00 \$00 \$00 \$00 CS
9141	ECU2	SID\$09	INF\$0B 36 M1		\$48 \$6B \$11 \$49 \$0B \$01 \$00 \$64 \$00 \$69 CS
9141	ECU2	SID\$09	INF\$0B 36 M2		\$48 \$6B \$11 \$49 \$0B \$02 \$00 \$00 \$00 \$00 CS
9141	ECU2	SID\$09	INF\$0B 36 M3		\$48 \$6B \$11 \$49 \$0B \$03 \$00 \$14 \$00 \$19 CS
9141	ECU2	SID\$09	INF\$0B 36 M4		\$48 \$6B \$11 \$49 \$0B \$04 \$00 \$00 \$00 \$00 CS
9141	ECU2	SID\$09	INF\$0B 36 M5		\$48 \$6B \$11 \$49 \$0B \$05 \$00 \$28 \$00 \$2D CS
9141	ECU2	SID\$09	INF\$0B 36 M6		\$48 \$6B \$11 \$49 \$0B \$06 \$00 \$00 \$00 \$00 CS
9141	ECU2	SID\$09	INF\$0B 36 M7		\$48 \$6B \$11 \$49 \$0B \$07 \$00 \$00 \$00 \$00 CS
9141	ECU2	SID\$09	INF\$0B 36 M8		\$48 \$6B \$11 \$49 \$0B \$08 \$00 \$00 \$00 \$00 CS

9141	ECU3	SID\$09	INF\$04	9	M6	\$48	\$6B	\$12	\$49	\$04	\$06	\$39	\$37	\$37	\$37	CS
9141	ECU3	SID\$09	INF\$04	9	M7	\$48	\$6B	\$12	\$49	\$04	\$07	\$00	\$00	\$00	\$00	CS
9141	ECU3	SID\$09	INF\$04	9	M8	\$48	\$6B	\$12	\$49	\$04	\$08	\$00	\$00	\$00	\$00	CS
9141	ECU3	SID\$09	INF\$04	9	M9	\$48	\$6B	\$12	\$49	\$04	\$09	\$33	\$33	\$35	\$38	CS
9141	ECU3	SID\$09	INF\$04	9	M10	\$48	\$6B	\$12	\$49	\$04	\$0A	\$39	\$37	\$37	\$36	CS
9141	ECU3	SID\$09	INF\$04	9	M11	\$48	\$6B	\$12	\$49	\$04	\$0B	\$00	\$00	\$00	\$00	CS
9141	ECU3	SID\$09	INF\$04	9	M12	\$48	\$6B	\$12	\$49	\$04	\$0C	\$00	\$00	\$00	\$00	CS
9141	ECU3	SID\$09	INF\$04	9	M13	\$48	\$6B	\$12	\$49	\$04	\$0D	\$34	\$33	\$35	\$38	CS
9141	ECU3	SID\$09	INF\$04	9	M14	\$48	\$6B	\$12	\$49	\$04	\$0E	\$39	\$37	\$37	\$35	CS
9141	ECU3	SID\$09	INF\$04	9	M15	\$48	\$6B	\$12	\$49	\$04	\$0F	\$00	\$00	\$00	\$00	CS
9141	ECU3	SID\$09	INF\$04	9	M16	\$48	\$6B	\$12	\$49	\$04	\$10	\$00	\$00	\$00	\$00	CS
9141	ECU3	SID\$09	INF\$04	9	M17	\$48	\$6B	\$12	\$49	\$04	\$11	\$35	\$33	\$35	\$38	CS
9141	ECU3	SID\$09	INF\$04	9	M18	\$48	\$6B	\$12	\$49	\$04	\$12	\$39	\$37	\$37	\$34	CS
9141	ECU3	SID\$09	INF\$04	9	M19	\$48	\$6B	\$12	\$49	\$04	\$13	\$00	\$00	\$00	\$00	CS
9141	ECU3	SID\$09	INF\$04	9	M20	\$48	\$6B	\$12	\$49	\$04	\$14	\$00	\$00	\$00	\$00	CS
9141	ECU3	SID\$09	INF\$04	9	M21	\$48	\$6B	\$12	\$49	\$04	\$15	\$36	\$33	\$35	\$38	CS
9141	ECU3	SID\$09	INF\$04	9	M22	\$48	\$6B	\$12	\$49	\$04	\$16	\$39	\$37	\$37	\$33	CS
9141	ECU3	SID\$09	INF\$04	9	M23	\$48	\$6B	\$12	\$49	\$04	\$17	\$00	\$00	\$00	\$00	CS
9141	ECU3	SID\$09	INF\$04	9	M24	\$48	\$6B	\$12	\$49	\$04	\$18	\$00	\$00	\$00	\$00	CS
9141	ECU3	SID\$09	INF\$04	9	M25	\$48	\$6B	\$12	\$49	\$04	\$19	\$37	\$33	\$35	\$38	CS
9141	ECU3	SID\$09	INF\$04	9	M26	\$48	\$6B	\$12	\$49	\$04	\$1A	\$39	\$37	\$37	\$32	CS
9141	ECU3	SID\$09	INF\$04	9	M27	\$48	\$6B	\$12	\$49	\$04	\$1B	\$00	\$00	\$00	\$00	CS
9141	ECU3	SID\$09	INF\$04	9	M28	\$48	\$6B	\$12	\$49	\$04	\$1C	\$00	\$00	\$00	\$00	CS
9141	ECU3	SID\$09	INF\$04	9	M29	\$48	\$6B	\$12	\$49	\$04	\$1D	\$38	\$33	\$35	\$38	CS
9141	ECU3	SID\$09	INF\$04	9	M30	\$48	\$6B	\$12	\$49	\$04	\$1E	\$39	\$37	\$37	\$31	CS
9141	ECU3	SID\$09	INF\$04	9	M31	\$48	\$6B	\$12	\$49	\$04	\$1F	\$00	\$00	\$00	\$00	CS
9141	ECU3	SID\$09	INF\$04	9	M32	\$48	\$6B	\$12	\$49	\$04	\$20	\$00	\$00	\$00	\$00	CS
9141	ECU3	SID\$09	INF\$04	9	M33	\$48	\$6B	\$12	\$49	\$04	\$21	\$39	\$33	\$35	\$38	CS
9141	ECU3	SID\$09	INF\$04	9	M34	\$48	\$6B	\$12	\$49	\$04	\$22	\$39	\$37	\$37	\$30	CS
9141	ECU3	SID\$09	INF\$04	9	M35	\$48	\$6B	\$12	\$49	\$04	\$23	\$00	\$00	\$00	\$00	CS
9141	ECU3	SID\$09	INF\$04	9	M36	\$48	\$6B	\$12	\$49	\$04	\$24	\$00	\$00	\$00	\$00	CS
9141	ECU3	SID\$09	INF\$05	9		\$48	\$6B	\$12	\$49	\$05	\$09	CS				
9141	ECU3	SID\$09	INF\$06	9	M1	\$48	\$6B	\$12	\$49	\$06	\$01	\$37	\$91	\$BC	\$88	CS
9141	ECU3	SID\$09	INF\$06	9	M2	\$48	\$6B	\$12	\$49	\$06	\$02	\$38	\$91	\$BC	\$87	CS
9141	ECU3	SID\$09	INF\$06	9	M3	\$48	\$6B	\$12	\$49	\$06	\$03	\$39	\$91	\$BC	\$86	CS
9141	ECU3	SID\$09	INF\$06	9	M4	\$48	\$6B	\$12	\$49	\$06	\$04	\$3A	\$91	\$BC	\$85	CS
9141	ECU3	SID\$09	INF\$06	9	M5	\$48	\$6B	\$12	\$49	\$06	\$05	\$3B	\$91	\$BC	\$84	CS
9141	ECU3	SID\$09	INF\$06	9	M6	\$48	\$6B	\$12	\$49	\$06	\$06	\$3C	\$91	\$BC	\$83	CS
9141	ECU3	SID\$09	INF\$06	9	M7	\$48	\$6B	\$12	\$49	\$06	\$07	\$3D	\$91	\$BC	\$82	CS
9141	ECU3	SID\$09	INF\$06	9	M8	\$48	\$6B	\$12	\$49	\$06	\$08	\$3E	\$55	\$AA	\$81	CS
9141	ECU3	SID\$09	INF\$06	9	M9	\$48	\$6B	\$12	\$49	\$06	\$09	\$3F	\$FF	\$00	\$80	CS
9141	ECU4	SID\$09	INF\$00			\$48	\$6B	\$13	\$49	\$00	\$3C	\$00	\$00	\$00	\$00	CS
9141	ECU4	SID\$09	INF\$03	9		\$48	\$6B	\$13	\$49	\$03	\$24	CS				
9141	ECU4	SID\$09	INF\$04	9	M1	\$48	\$6B	\$13	\$49	\$04	\$01	\$31	\$34	\$35	\$38	CS
9141	ECU4	SID\$09	INF\$04	9	M2	\$48	\$6B	\$13	\$49	\$04	\$02	\$39	\$37	\$37	\$38	CS
9141	ECU4	SID\$09	INF\$04	9	M3	\$48	\$6B	\$13	\$49	\$04	\$03	\$00	\$00	\$00	\$00	CS
9141	ECU4	SID\$09	INF\$04	9	M4	\$48	\$6B	\$13	\$49	\$04	\$04	\$00	\$00	\$00	\$00	CS
9141	ECU4	SID\$09	INF\$04	9	M5	\$48	\$6B	\$13	\$49	\$04	\$05	\$32	\$34	\$35	\$38	CS
9141	ECU4	SID\$09	INF\$04	9	M6	\$48	\$6B	\$13	\$49	\$04	\$06	\$39	\$37	\$37	\$37	CS
9141	ECU4	SID\$09	INF\$04	9	M7	\$48	\$6B	\$13	\$49	\$04	\$07	\$00	\$00	\$00	\$00	CS
9141	ECU4	SID\$09	INF\$04	9	M8	\$48	\$6B	\$13	\$49	\$04	\$08	\$00	\$00	\$00	\$00	CS
9141	ECU4	SID\$09	INF\$04	9	M9	\$48	\$6B	\$13	\$49	\$04	\$09	\$33	\$34	\$35	\$38	CS
9141	ECU4	SID\$09	INF\$04	9	M10	\$48	\$6B	\$13	\$49	\$04	\$0A	\$39	\$37	\$37	\$36	CS
9141	ECU4	SID\$09	INF\$04	9	M11	\$48	\$6B	\$13	\$49	\$04	\$0B	\$00	\$00	\$00	\$00	CS
9141	ECU4	SID\$09	INF\$04	9	M12	\$48	\$6B	\$13	\$49	\$04	\$0C	\$00	\$00	\$00	\$00	CS
9141	ECU4	SID\$09	INF\$04	9	M13	\$48	\$6B	\$13	\$49	\$04	\$0D	\$34	\$34	\$35	\$38	CS
9141	ECU4	SID\$09	INF\$04	9	M14	\$48	\$6B	\$13	\$49	\$04	\$0E	\$39	\$37	\$37	\$35	CS
9141	ECU4	SID\$09	INF\$04	9	M15	\$48	\$6B	\$13	\$49	\$04	\$0F	\$00	\$00	\$00	\$00	CS

9141	ECU4	SID\$09	INF\$04	9	M16	\$48	\$6B	\$13	\$49	\$04	\$10	\$00	\$00	\$00	\$00	CS
9141	ECU4	SID\$09	INF\$04	9	M17	\$48	\$6B	\$13	\$49	\$04	\$11	\$35	\$34	\$35	\$38	CS
9141	ECU4	SID\$09	INF\$04	9	M18	\$48	\$6B	\$13	\$49	\$04	\$12	\$39	\$37	\$37	\$34	CS
9141	ECU4	SID\$09	INF\$04	9	M19	\$48	\$6B	\$13	\$49	\$04	\$13	\$00	\$00	\$00	\$00	CS
9141	ECU4	SID\$09	INF\$04	9	M20	\$48	\$6B	\$13	\$49	\$04	\$14	\$00	\$00	\$00	\$00	CS
9141	ECU4	SID\$09	INF\$04	9	M21	\$48	\$6B	\$13	\$49	\$04	\$15	\$36	\$34	\$35	\$38	CS
9141	ECU4	SID\$09	INF\$04	9	M22	\$48	\$6B	\$13	\$49	\$04	\$16	\$39	\$37	\$37	\$33	CS
9141	ECU4	SID\$09	INF\$04	9	M23	\$48	\$6B	\$13	\$49	\$04	\$17	\$00	\$00	\$00	\$00	CS
9141	ECU4	SID\$09	INF\$04	9	M24	\$48	\$6B	\$13	\$49	\$04	\$18	\$00	\$00	\$00	\$00	CS
9141	ECU4	SID\$09	INF\$04	9	M25	\$48	\$6B	\$13	\$49	\$04	\$19	\$37	\$34	\$35	\$38	CS
9141	ECU4	SID\$09	INF\$04	9	M26	\$48	\$6B	\$13	\$49	\$04	\$1A	\$39	\$37	\$37	\$32	CS
9141	ECU4	SID\$09	INF\$04	9	M27	\$48	\$6B	\$13	\$49	\$04	\$1B	\$00	\$00	\$00	\$00	CS
9141	ECU4	SID\$09	INF\$04	9	M28	\$48	\$6B	\$13	\$49	\$04	\$1C	\$00	\$00	\$00	\$00	CS
9141	ECU4	SID\$09	INF\$04	9	M29	\$48	\$6B	\$13	\$49	\$04	\$1D	\$38	\$34	\$35	\$38	CS
9141	ECU4	SID\$09	INF\$04	9	M30	\$48	\$6B	\$13	\$49	\$04	\$1E	\$39	\$37	\$37	\$31	CS
9141	ECU4	SID\$09	INF\$04	9	M31	\$48	\$6B	\$13	\$49	\$04	\$1F	\$00	\$00	\$00	\$00	CS
9141	ECU4	SID\$09	INF\$04	9	M32	\$48	\$6B	\$13	\$49	\$04	\$20	\$00	\$00	\$00	\$00	CS
9141	ECU4	SID\$09	INF\$04	9	M33	\$48	\$6B	\$13	\$49	\$04	\$21	\$39	\$34	\$35	\$38	CS
9141	ECU4	SID\$09	INF\$04	9	M34	\$48	\$6B	\$13	\$49	\$04	\$22	\$39	\$37	\$37	\$30	CS
9141	ECU4	SID\$09	INF\$04	9	M35	\$48	\$6B	\$13	\$49	\$04	\$23	\$00	\$00	\$00	\$00	CS
9141	ECU4	SID\$09	INF\$04	9	M36	\$48	\$6B	\$13	\$49	\$04	\$24	\$00	\$00	\$00	\$00	CS
9141	ECU4	SID\$09	INF\$05	9		\$48	\$6B	\$13	\$49	\$05	\$09	CS				
9141	ECU4	SID\$09	INF\$06	9	M1	\$48	\$6B	\$13	\$49	\$06	\$01	\$47	\$91	\$BC	\$88	CS
9141	ECU4	SID\$09	INF\$06	9	M2	\$48	\$6B	\$13	\$49	\$06	\$02	\$48	\$91	\$BC	\$87	CS
9141	ECU4	SID\$09	INF\$06	9	M3	\$48	\$6B	\$13	\$49	\$06	\$03	\$49	\$91	\$BC	\$86	CS
9141	ECU4	SID\$09	INF\$06	9	M4	\$48	\$6B	\$13	\$49	\$06	\$04	\$4A	\$91	\$BC	\$85	CS
9141	ECU4	SID\$09	INF\$06	9	M5	\$48	\$6B	\$13	\$49	\$06	\$05	\$4B	\$91	\$BC	\$84	CS
9141	ECU4	SID\$09	INF\$06	9	M6	\$48	\$6B	\$13	\$49	\$06	\$06	\$4C	\$91	\$BC	\$83	CS
9141	ECU4	SID\$09	INF\$06	9	M7	\$48	\$6B	\$13	\$49	\$06	\$07	\$4D	\$91	\$BC	\$82	CS
9141	ECU4	SID\$09	INF\$06	9	M8	\$48	\$6B	\$13	\$49	\$06	\$08	\$4E	\$55	\$AA	\$81	CS
9141	ECU4	SID\$09	INF\$06	9	M9	\$48	\$6B	\$13	\$49	\$06	\$09	\$4F	\$FF	\$00	\$80	CS
9141	ECU5	SID\$09	INF\$00			\$48	\$6B	\$14	\$49	\$00	\$3C	\$00	\$00	\$00	\$00	CS
9141	ECU5	SID\$09	INF\$03	9		\$48	\$6B	\$14	\$49	\$03	\$24	CS				
9141	ECU5	SID\$09	INF\$04	9	M1	\$48	\$6B	\$14	\$49	\$04	\$01	\$31	\$35	\$35	\$38	CS
9141	ECU5	SID\$09	INF\$04	9	M2	\$48	\$6B	\$14	\$49	\$04	\$02	\$39	\$37	\$37	\$38	CS
9141	ECU5	SID\$09	INF\$04	9	M3	\$48	\$6B	\$14	\$49	\$04	\$03	\$00	\$00	\$00	\$00	CS
9141	ECU5	SID\$09	INF\$04	9	M4	\$48	\$6B	\$14	\$49	\$04	\$04	\$00	\$00	\$00	\$00	CS
9141	ECU5	SID\$09	INF\$04	9	M5	\$48	\$6B	\$14	\$49	\$04	\$05	\$32	\$35	\$35	\$38	CS
9141	ECU5	SID\$09	INF\$04	9	M6	\$48	\$6B	\$14	\$49	\$04	\$06	\$39	\$37	\$37	\$37	CS
9141	ECU5	SID\$09	INF\$04	9	M7	\$48	\$6B	\$14	\$49	\$04	\$07	\$00	\$00	\$00	\$00	CS
9141	ECU5	SID\$09	INF\$04	9	M8	\$48	\$6B	\$14	\$49	\$04	\$08	\$00	\$00	\$00	\$00	CS
9141	ECU5	SID\$09	INF\$04	9	M9	\$48	\$6B	\$14	\$49	\$04	\$09	\$33	\$35	\$35	\$38	CS
9141	ECU5	SID\$09	INF\$04	9	M10	\$48	\$6B	\$14	\$49	\$04	\$0A	\$39	\$37	\$37	\$36	CS
9141	ECU5	SID\$09	INF\$04	9	M11	\$48	\$6B	\$14	\$49	\$04	\$0B	\$00	\$00	\$00	\$00	CS
9141	ECU5	SID\$09	INF\$04	9	M12	\$48	\$6B	\$14	\$49	\$04	\$0C	\$00	\$00	\$00	\$00	CS
9141	ECU5	SID\$09	INF\$04	9	M13	\$48	\$6B	\$14	\$49	\$04	\$0D	\$34	\$35	\$35	\$38	CS
9141	ECU5	SID\$09	INF\$04	9	M14	\$48	\$6B	\$14	\$49	\$04	\$0E	\$39	\$37	\$37	\$35	CS
9141	ECU5	SID\$09	INF\$04	9	M15	\$48	\$6B	\$14	\$49	\$04	\$0F	\$00	\$00	\$00	\$00	CS
9141	ECU5	SID\$09	INF\$04	9	M16	\$48	\$6B	\$14	\$49	\$04	\$10	\$00	\$00	\$00	\$00	CS
9141	ECU5	SID\$09	INF\$04	9	M17	\$48	\$6B	\$14	\$49	\$04	\$11	\$35	\$35	\$35	\$38	CS
9141	ECU5	SID\$09	INF\$04	9	M18	\$48	\$6B	\$14	\$49	\$04	\$12	\$39	\$37	\$37	\$34	CS
9141	ECU5	SID\$09	INF\$04	9	M19	\$48	\$6B	\$14	\$49	\$04	\$13	\$00	\$00	\$00	\$00	CS
9141	ECU5	SID\$09	INF\$04	9	M20	\$48	\$6B	\$14	\$49	\$04	\$14	\$00	\$00	\$00	\$00	CS
9141	ECU5	SID\$09	INF\$04	9	M21	\$48	\$6B	\$14	\$49	\$04	\$15	\$36	\$35	\$35	\$38	CS
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9141	ECU8	SID\$09	INF\$04	9	M26	\$48	\$6B	\$17	\$49	\$04	\$1A	\$39	\$37	\$37	\$32	CS
9141	ECU8	SID\$09	INF\$04	9	M27	\$48	\$6B	\$17	\$49	\$04	\$1B	\$00	\$00	\$00	\$00	CS
9141	ECU8	SID\$09	INF\$04	9	M28	\$48	\$6B	\$17	\$49	\$04	\$1C	\$00	\$00	\$00	\$00	CS
9141	ECU8	SID\$09	INF\$04	9	M29	\$48	\$6B	\$17	\$49	\$04	\$1D	\$38	\$38	\$35	\$38	CS
9141	ECU8	SID\$09	INF\$04	9	M30	\$48	\$6B	\$17	\$49	\$04	\$1E	\$39	\$37	\$37	\$31	CS
9141	ECU8	SID\$09	INF\$04	9	M31	\$48	\$6B	\$17	\$49	\$04	\$1F	\$00	\$00	\$00	\$00	CS
9141	ECU8	SID\$09	INF\$04	9	M32	\$48	\$6B	\$17	\$49	\$04	\$20	\$00	\$00	\$00	\$00	CS
9141	ECU8	SID\$09	INF\$04	9	M33	\$48	\$6B	\$17	\$49	\$04	\$21	\$39	\$38	\$35	\$38	CS
9141	ECU8	SID\$09	INF\$04	9	M34	\$48	\$6B	\$17	\$49	\$04	\$22	\$39	\$37	\$37	\$30	CS
9141	ECU8	SID\$09	INF\$04	9	M35	\$48	\$6B	\$17	\$49	\$04	\$23	\$00	\$00	\$00	\$00	CS
9141	ECU8	SID\$09	INF\$04	9	M36	\$48	\$6B	\$17	\$49	\$04	\$24	\$00	\$00	\$00	\$00	CS
9141	ECU8	SID\$09	INF\$05	9		\$48	\$6B	\$17	\$49	\$05	\$09					CS
9141	ECU8	SID\$09	INF\$06	9	M1	\$48	\$6B	\$17	\$49	\$06	\$01	\$87	\$91	\$BC	\$88	CS
9141	ECU8	SID\$09	INF\$06	9	M2	\$48	\$6B	\$17	\$49	\$06	\$02	\$88	\$91	\$BC	\$87	CS
9141	ECU8	SID\$09	INF\$06	9	M3	\$48	\$6B	\$17	\$49	\$06	\$03	\$89	\$91	\$BC	\$86	CS
9141	ECU8	SID\$09	INF\$06	9	M4	\$48	\$6B	\$17	\$49	\$06	\$04	\$8A	\$91	\$BC	\$85	CS
9141	ECU8	SID\$09	INF\$06	9	M5	\$48	\$6B	\$17	\$49	\$06	\$05	\$8B	\$91	\$BC	\$84	CS
9141	ECU8	SID\$09	INF\$06	9	M6	\$48	\$6B	\$17	\$49	\$06	\$06	\$8C	\$91	\$BC	\$83	CS
9141	ECU8	SID\$09	INF\$06	9	M7	\$48	\$6B	\$17	\$49	\$06	\$07	\$8D	\$91	\$BC	\$82	CS
9141	ECU8	SID\$09	INF\$06	9	M8	\$48	\$6B	\$17	\$49	\$06	\$08	\$8E	\$55	\$AA	\$81	CS
9141	ECU8	SID\$09	INF\$06	9	M9	\$48	\$6B	\$17	\$49	\$06	\$09	\$8F	\$FF	\$00	\$80	CS

Where CS indicates a correctly computed Checksum as defined by ISO 9141-2.

Figure 16 - Pre-defined messages for ISO 9141-2

5.4.5.4 ISO 9141-2 Message Timing

For convenience, the test cases in this document will use the text in the 'Parameter Reference' column when referring to the specific value, detailed in the 'Value' column of the table below. Unless otherwise specified, the following timing values shall be used:

Parameter Reference	Value
W1_MIN	60 ms
W1	100 ms
W1_MAX	300 ms
W2_MIN	5 ms
W2	15 ms
W2_MAX	20 ms
W3_MIN	0 ms
W3	15 ms
W3_MAX	20 ms
W4_MIN	25 ms
W4	40 ms
W4_MAX	50 ms
W5 (also known as W0)	At least 300 ms
W5 (also known as W0)	5 ms
P1_MIN	0 ms
P1	5 ms
P1_MAX	20 ms
P2_MIN	0 ms
P2	25 ms
P2_MAX	50 ms
P3_MIN	0 ms
P3	25 ms
P3_MAX	5000 ms
P4_MIN	0 ms
P4	25 ms
P4_MAX	20 ms

Figure 17 - Pre-defined message timing for ISO 9141-2

5.4.5.5 ISO 9141-2 Connected State

The device shall initially be in the 'Power On' state with the K and L Lines connected and the appropriate pull-up applied (as depicted in 5.4.5.1).

5.4.5.6 ISO 9141-2 (2 ECUs) Initialized State

The OBD network shall have determined to be ISO 9141-2 at a baud rate of 10400 with two OBD II ECUs having been identified. The DUT may produce a periodic message transmission to keep the network alive. A successful completion of any section from 8.4.2 to 8.4.3 shall define this state.

5.4.5.7 ISO 9141-2 (8 ECUs) Initialized State

The OBD network shall have determined to be ISO 9141-2 at a baud rate of 10400 with eight OBD II ECUs having been identified. The DUT may produce a periodic message transmission to keep the network alive. A successful completion of 8.4.3 shall define this state.

5.4.5.8 ISO 9141-2 (2 ECUs) SID9 Ready State

The SID \$09 INFOTYPES shall be known for each of the two OBD II ECUs on the network. The DUT may produce a periodic message transmission to keep the network alive. A successful completion of 9.4.17 shall define this state.

5.4.5.9 ISO 9141-2 (2 ECUs) SID9 Diesel Ready State

The SID \$09 INFOTYPES shall be known for each of the two OBD II ECUs on the network. The DUT may produce a periodic message transmission to keep the network alive. A successful completion of 0 shall define this state.

5.4.5.10 ISO 9141-2 (8 ECUs) SID9 Ready State

The SID \$09 INFOTYPES shall be known for each of the eight OBD II ECUs on the network. The DUT may produce a periodic message transmission to keep the network alive. A successful completion of 9.4.19 shall define this state.

5.4.6 SAE J1850 VPW

5.4.6.1 SAE J1850 VPW Electrical Connections

Figure 18 outlines the typical set-up for SAE J1850 VPW testing.

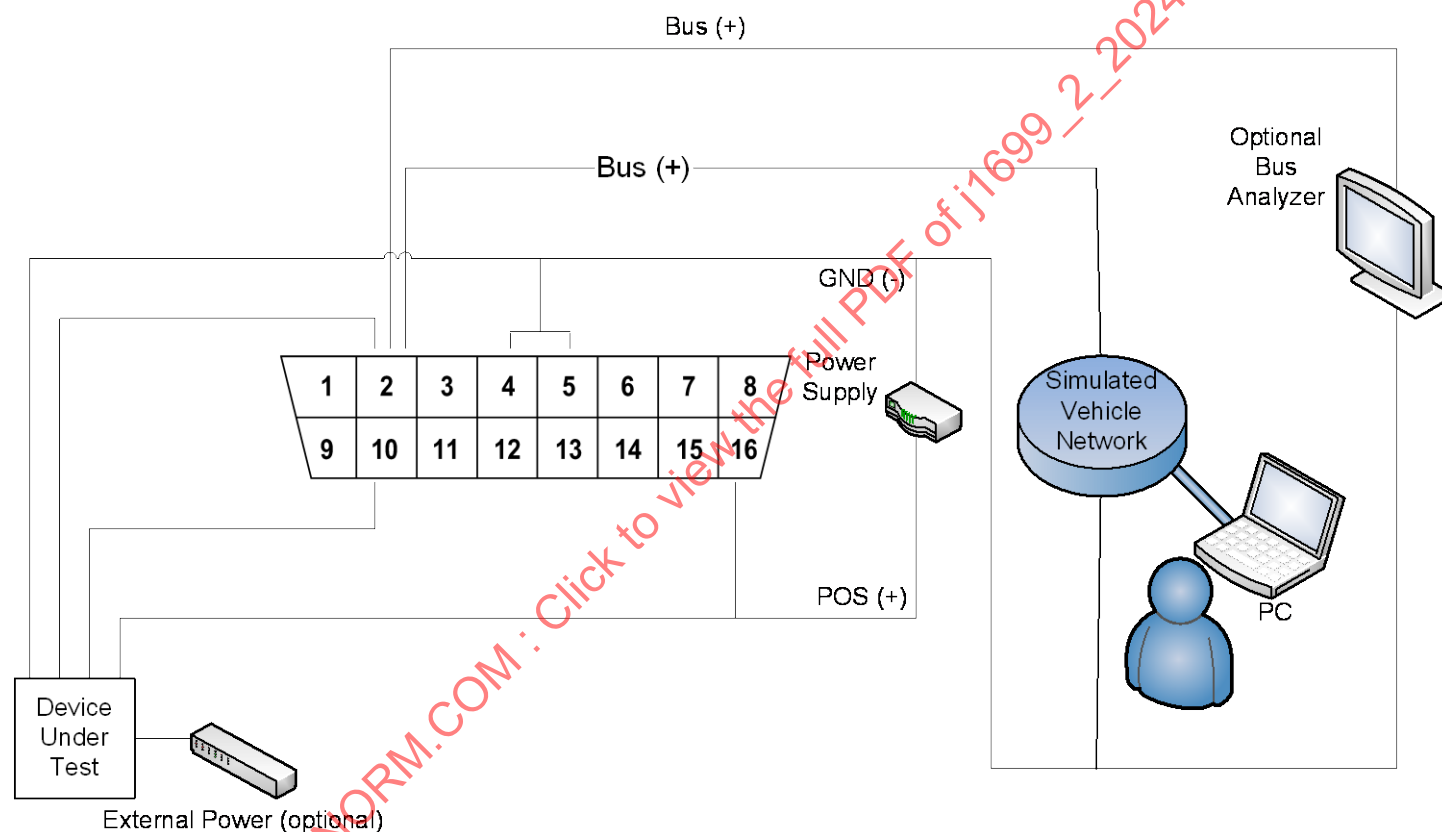


Figure 18 - Test set-up for SAE J1850 VPW testing

5.4.6.2 SAE J1850 VPW ECU Addresses

The following address bytes have been pre-defined for SAE J1850 VPW. For convenience, the test cases in this document will use the text in the 'ECU Reference' column when referring to the specific set of address bytes, detailed in the 'Address Bytes' column of the table below.

ECU Reference	Address Bytes
ECU #1	\$10
ECU #2	\$11
ECU #3	\$12
ECU #4	\$13
ECU #5	\$14
ECU #6	\$15
ECU #7	\$16
ECU #8	\$17

Figure 19 - ECU reference and associated addresses for SAE J1850 VPW

5.4.6.3 SAE J1850 VPW Messages

The following messages have been pre-defined for SAE J1850 VPW. For convenience, the test cases in this document will use the text in the 'Message Reference' column when referring to the specific set of message bytes, detailed in the 'Message Bytes' column of the table below.

Message Reference	Message Bytes
1850VPW_SID\$01_PID\$00	\$68 \$6A \$F1 \$01 \$00
1850VPW_ECU1_SID\$01_PID\$00	\$48 \$6B \$10 \$41 \$00 \$80 \$10 \$00 \$00
1850VPW_ECU2_SID\$01_PID\$00	\$48 \$6B \$11 \$41 \$00 \$80 \$10 \$00 \$00
1850VPW_ECU3_SID\$01_PID\$00	\$48 \$6B \$12 \$41 \$00 \$00 \$00 \$00 \$00
1850VPW_ECU4_SID\$01_PID\$00	\$48 \$6B \$13 \$41 \$00 \$00 \$00 \$00 \$00
1850VPW_ECU5_SID\$01_PID\$00	\$48 \$6B \$14 \$41 \$00 \$00 \$00 \$00 \$00
1850VPW_ECU6_SID\$01_PID\$00	\$48 \$6B \$15 \$41 \$00 \$00 \$00 \$00 \$00
1850VPW_ECU7_SID\$01_PID\$00	\$48 \$6B \$16 \$41 \$00 \$00 \$00 \$00 \$00
1850VPW_ECU8_SID\$01_PID\$00	\$48 \$6B \$17 \$41 \$00 \$00 \$00 \$00 \$00
1850VPW_SID\$01_PID\$01	\$68 \$6A \$F1 \$01 \$01
1850VPW_SID\$01_PID\$0C	\$68 \$6A \$F1 \$01 \$0C
1850VPW_SID\$01_PID\$20	\$68 \$6A \$F1 \$01 \$20
1850VPW_SID\$01_PID\$40	\$68 \$6A \$F1 \$01 \$40
1850VPW_SID\$01_PID\$41	\$68 \$6A \$F1 \$01 \$41
1850VPW_ECU1_SID\$01_PID\$00_20	\$48 \$6B \$10 \$41 \$00 \$80 \$10 \$00 \$01
1850VPW_ECU1_SID\$01_PID\$01_SPARK	\$48 \$6B \$10 \$41 \$01 \$00 \$07 \$EF \$EF
1850VPW_ECU1_SID\$01_PID\$01_COMP	\$48 \$6B \$10 \$41 \$01 \$00 \$0F \$EB \$EB
1850VPW_ECU1_SID\$01_PID\$0C_KOEO	\$48 \$6B \$10 \$41 \$0C \$00 \$00
1850VPW_ECU1_SID\$01_PID\$20	\$48 \$6B \$10 \$41 \$20 \$00 \$00 \$00 \$01
1850VPW_ECU1_SID\$01_PID\$40	\$48 \$6B \$10 \$41 \$40 \$10 \$00 \$00 \$00
1850VPW_ECU1_SID\$01_PID\$41_SPARK	\$48 \$6B \$10 \$41 \$41 \$00 \$07 \$EF \$EF
1850VPW_ECU2_SID\$01_PID\$01_SPARK	\$48 \$6B \$11 \$41 \$01 \$81 \$44 \$00 \$00
1850VPW_ECU2_SID\$01_PID\$01_COMP	\$48 \$6B \$11 \$41 \$01 \$81 \$4C \$00 \$00
1850VPW_ECU2_SID\$01_PID\$0C_KOEO	\$48 \$6B \$11 \$41 \$0C \$00 \$00
1850VPW_SID\$02_PID\$02	\$68 \$6A \$F1 \$02 \$02 \$00
1850VPW_ECU1_SID\$02_PID\$02_NoDTC	\$48 \$6B \$10 \$42 \$02 \$00 \$00 \$00
1850VPW_ECU2_SID\$02_PID\$02_NoDTC	\$48 \$6B \$11 \$42 \$02 \$00 \$00 \$00
1850VPW_ECU1_SID\$02_PID\$02_DTC	\$48 \$6B \$10 \$42 \$02 \$00 \$01 \$07
1850VPW_SID\$03	\$68 \$6A \$F1 \$03
1850VPW_ECU1_SID\$03_NoDTC	\$48 \$6B \$10 \$43 \$00
1850VPW_ECU1_SID\$03_DTC_M1	\$48 \$6B \$10 \$43 \$01 \$07 \$01 \$10 \$01 \$15
1850VPW_ECU1_SID\$03_DTC_M2	\$48 \$6B \$10 \$43 \$01 \$24 \$00 \$00 \$00 \$00
1850VPW_ECU2_SID\$03_NoDTC	\$48 \$6B \$11 \$43 \$00

1850VPW_SID\$04	\$68 \$6A \$F1 \$04
1850VPW_ECU1_SID\$04_DONE	\$48 \$6B \$10 \$44
1850VPW_ECU1_SID\$04_NRC22	\$48 \$6B \$10 \$7F \$44 \$22
1850VPW_ECU1_SID\$04_NRC78	\$48 \$6B \$10 \$7F \$44 \$78
1850VPW_ECU2_SID\$04_DONE	\$48 \$6B \$11 \$44
1850VPW_ECU2_SID\$04_NRC22	\$48 \$6B \$11 \$7F \$44 \$22
1850VPW_SID\$05_MID\$01	\$68 \$6A \$F1 \$05 \$01 \$02
1850VPW_ECU1_SID\$05_MID\$01	\$48 \$6B \$10 \$45 \$01 \$02 \$5A
1850VPW_SID\$06_MID\$00	\$68 \$6A \$F1 \$06 \$00
1850VPW_ECU1_SID\$06_MID\$00	\$48 \$6B \$10 \$46 \$00 \$CC \$00 \$00 \$00
1850VPW_SID\$07	\$68 \$6A \$F1 \$07
1850VPW_ECU1_SID\$07_NoDTC	\$48 \$6B \$10 \$47 \$00
1850VPW_ECU1_SID\$07_DTC_M1	\$48 \$6B \$10 \$47 \$01 \$07 \$01 \$10 \$01 \$15
1850VPW_ECU1_SID\$07_DTC_M2	\$48 \$6B \$10 \$47 \$01 \$24 \$00 \$00 \$00 \$00
1850VPW_ECU2_SID\$07_NoDTC	\$48 \$6B \$11 \$47 \$00
1850VPW_SID\$08_TID\$00	\$68 \$6A \$F1 \$08
1850VPW_ECU1_SID\$08_TID\$00	\$48 \$6B \$10 \$48 \$00 \$80 \$00 \$00 \$00
1850VPW_SID\$09_INF\$00	\$68 \$6A \$F1 \$09 \$00
1850VPW_SID\$09_INF\$01	\$68 \$6A \$F1 \$09 \$01
1850VPW_SID\$09_INF\$02	\$68 \$6A \$F1 \$09 \$02
1850VPW_SID\$09_INF\$03	\$68 \$6A \$F1 \$09 \$03
1850VPW_SID\$09_INF\$04	\$68 \$6A \$F1 \$09 \$04
1850VPW_SID\$09_INF\$05	\$68 \$6A \$F1 \$09 \$05
1850VPW_SID\$09_INF\$06	\$68 \$6A \$F1 \$09 \$06
1850VPW_SID\$09_INF\$07	\$68 \$6A \$F1 \$09 \$07
1850VPW_SID\$09_INF\$08	\$68 \$6A \$F1 \$09 \$08
1850VPW_SID\$09_INF\$0B	\$68 \$6A \$F1 \$09 \$0B
1850VPW_ECU1_SID\$09_INF\$00	\$48 \$6B \$10 \$49 \$00 \$FF \$00 \$00 \$00
1850VPW_ECU1_SID\$09_INF\$00_DIESEL	\$48 \$6B \$10 \$49 \$00 \$FE \$20 \$00 \$00
1850VPW_ECU1_SID\$09_INF\$01	\$48 \$6B \$10 \$49 \$01 \$05
1850VPW_ECU1_SID\$09_INF\$02_M1	\$48 \$6B \$10 \$49 \$02 \$01 \$00 \$00 \$00 \$31
1850VPW_ECU1_SID\$09_INF\$02_M2	\$48 \$6B \$10 \$49 \$02 \$02 \$47 \$59 \$44 \$45
1850VPW_ECU1_SID\$09_INF\$02_M3	\$48 \$6B \$10 \$49 \$02 \$03 \$36 \$33 \$41 \$37
1850VPW_ECU1_SID\$09_INF\$02_M4	\$48 \$6B \$10 \$49 \$02 \$04 \$41 \$30 \$30 \$30
1850VPW_ECU1_SID\$09_INF\$02_M5	\$48 \$6B \$10 \$49 \$02 \$05 \$30 \$30 \$30 \$30
1850VPW_ECU1_SID\$09_INF\$03	\$48 \$6B \$10 \$49 \$03 \$04
1850VPW_ECU1_SID\$09_INF\$03_9	\$48 \$6B \$10 \$49 \$03 \$24
1850VPW_ECU1_SID\$09_INF\$04_M1	\$48 \$6B \$10 \$49 \$04 \$01 \$31 \$32 \$35 \$38
1850VPW_ECU1_SID\$09_INF\$04_M2	\$48 \$6B \$10 \$49 \$04 \$02 \$39 \$37 \$37 \$32
1850VPW_ECU1_SID\$09_INF\$04_M3	\$48 \$6B \$10 \$49 \$04 \$03 \$00 \$00 \$00 \$00
1850VPW_ECU1_SID\$09_INF\$04_M4	\$48 \$6B \$10 \$49 \$04 \$04 \$00 \$00 \$00 \$00
1850VPW_ECU1_SID\$09_INF\$04_9_M1	\$48 \$6B \$10 \$49 \$04 \$01 \$31 \$31 \$35 \$38
1850VPW_ECU1_SID\$09_INF\$04_9_M2	\$48 \$6B \$10 \$49 \$04 \$02 \$39 \$37 \$37 \$38
1850VPW_ECU1_SID\$09_INF\$04_9_M3	\$48 \$6B \$10 \$49 \$04 \$03 \$00 \$00 \$00 \$00
1850VPW_ECU1_SID\$09_INF\$04_9_M4	\$48 \$6B \$10 \$49 \$04 \$04 \$00 \$00 \$00 \$00
1850VPW_ECU1_SID\$09_INF\$04_9_M5	\$48 \$6B \$10 \$49 \$04 \$05 \$32 \$31 \$35 \$38
1850VPW_ECU1_SID\$09_INF\$04_9_M6	\$48 \$6B \$10 \$49 \$04 \$06 \$39 \$37 \$37 \$37
1850VPW_ECU1_SID\$09_INF\$04_9_M7	\$48 \$6B \$10 \$49 \$04 \$07 \$00 \$00 \$00 \$00
1850VPW_ECU1_SID\$09_INF\$04_9_M8	\$48 \$6B \$10 \$49 \$04 \$08 \$00 \$00 \$00 \$00
1850VPW_ECU1_SID\$09_INF\$04_9_M9	\$48 \$6B \$10 \$49 \$04 \$09 \$33 \$31 \$35 \$38
1850VPW_ECU1_SID\$09_INF\$04_9_M10	\$48 \$6B \$10 \$49 \$04 \$0A \$39 \$37 \$37 \$36
1850VPW_ECU1_SID\$09_INF\$04_9_M11	\$48 \$6B \$10 \$49 \$04 \$0B \$00 \$00 \$00 \$00
1850VPW_ECU1_SID\$09_INF\$04_9_M12	\$48 \$6B \$10 \$49 \$04 \$0C \$00 \$00 \$00 \$00
1850VPW_ECU1_SID\$09_INF\$04_9_M13	\$48 \$6B \$10 \$49 \$04 \$0D \$34 \$31 \$35 \$38
1850VPW_ECU1_SID\$09_INF\$04_9_M14	\$48 \$6B \$10 \$49 \$04 \$0E \$39 \$37 \$37 \$35
1850VPW_ECU1_SID\$09_INF\$04_9_M15	\$48 \$6B \$10 \$49 \$04 \$0F \$00 \$00 \$00 \$00
1850VPW_ECU1_SID\$09_INF\$04_9_M16	\$48 \$6B \$10 \$49 \$04 \$10 \$00 \$00 \$00 \$00
1850VPW_ECU1_SID\$09_INF\$04_9_M17	\$48 \$6B \$10 \$49 \$04 \$11 \$35 \$31 \$35 \$38

1850VPW ECU1 SID\$09 INF\$04 9 M18	\$48 \$6B \$10 \$49 \$04 \$12 \$39 \$37 \$37 \$34
1850VPW ECU1 SID\$09 INF\$04 9 M19	\$48 \$6B \$10 \$49 \$04 \$13 \$00 \$00 \$00 \$00
1850VPW ECU1 SID\$09 INF\$04 9 M20	\$48 \$6B \$10 \$49 \$04 \$14 \$00 \$00 \$00 \$00
1850VPW ECU1 SID\$09 INF\$04 9 M21	\$48 \$6B \$10 \$49 \$04 \$15 \$36 \$31 \$35 \$38
1850VPW ECU1 SID\$09 INF\$04 9 M22	\$48 \$6B \$10 \$49 \$04 \$16 \$39 \$37 \$37 \$33
1850VPW ECU1 SID\$09 INF\$04 9 M23	\$48 \$6B \$10 \$49 \$04 \$17 \$00 \$00 \$00 \$00
1850VPW ECU1 SID\$09 INF\$04 9 M24	\$48 \$6B \$10 \$49 \$04 \$18 \$00 \$00 \$00 \$00
1850VPW ECU1 SID\$09 INF\$04 9 M25	\$48 \$6B \$10 \$49 \$04 \$19 \$37 \$31 \$35 \$38
1850VPW ECU1 SID\$09 INF\$04 9 M26	\$48 \$6B \$10 \$49 \$04 \$1A \$39 \$37 \$37 \$32
1850VPW ECU1 SID\$09 INF\$04 9 M27	\$48 \$6B \$10 \$49 \$04 \$1B \$00 \$00 \$00 \$00
1850VPW ECU1 SID\$09 INF\$04 9 M28	\$48 \$6B \$10 \$49 \$04 \$1C \$00 \$00 \$00 \$00
1850VPW ECU1 SID\$09 INF\$04 9 M29	\$48 \$6B \$10 \$49 \$04 \$1D \$38 \$31 \$35 \$38
1850VPW ECU1 SID\$09 INF\$04 9 M30	\$48 \$6B \$10 \$49 \$04 \$1E \$39 \$37 \$37 \$31
1850VPW ECU1 SID\$09 INF\$04 9 M31	\$48 \$6B \$10 \$49 \$04 \$1F \$00 \$00 \$00 \$00
1850VPW ECU1 SID\$09 INF\$04 9 M32	\$48 \$6B \$10 \$49 \$04 \$20 \$00 \$00 \$00 \$00
1850VPW ECU1 SID\$09 INF\$04 9 M33	\$48 \$6B \$10 \$49 \$04 \$21 \$39 \$31 \$35 \$38
1850VPW ECU1 SID\$09 INF\$04 9 M34	\$48 \$6B \$10 \$49 \$04 \$22 \$39 \$37 \$37 \$30
1850VPW ECU1 SID\$09 INF\$04 9 M35	\$48 \$6B \$10 \$49 \$04 \$23 \$00 \$00 \$00 \$00
1850VPW ECU1 SID\$09 INF\$04 9 M36	\$48 \$6B \$10 \$49 \$04 \$24 \$00 \$00 \$00 \$00
1850VPW ECU1 SID\$09 INF\$05	\$48 \$6B \$10 \$49 \$05 \$01
1850VPW ECU1 SID\$09 INF\$05 9	\$48 \$6B \$10 \$49 \$05 \$09
1850VPW ECU1 SID\$09 INF\$06	\$48 \$6B \$10 \$49 \$06 \$01 \$17 \$91 \$BC \$88
1850VPW ECU1 SID\$09 INF\$06 9 M1	\$48 \$6B \$10 \$49 \$06 \$01 \$17 \$91 \$BC \$88
1850VPW ECU1 SID\$09 INF\$06 9 M2	\$48 \$6B \$10 \$49 \$06 \$02 \$18 \$91 \$BC \$87
1850VPW ECU1 SID\$09 INF\$06 9 M3	\$48 \$6B \$10 \$49 \$06 \$03 \$19 \$91 \$BC \$86
1850VPW ECU1 SID\$09 INF\$06 9 M4	\$48 \$6B \$10 \$49 \$06 \$04 \$1A \$91 \$BC \$85
1850VPW ECU1 SID\$09 INF\$06 9 M5	\$48 \$6B \$10 \$49 \$06 \$05 \$1B \$91 \$BC \$84
1850VPW ECU1 SID\$09 INF\$06 9 M6	\$48 \$6B \$10 \$49 \$06 \$06 \$1C \$91 \$BC \$83
1850VPW ECU1 SID\$09 INF\$06 9 M7	\$48 \$6B \$10 \$49 \$06 \$07 \$1D \$91 \$BC \$82
1850VPW ECU1 SID\$09 INF\$06 9 M8	\$48 \$6B \$10 \$49 \$06 \$08 \$1E \$55 \$AA \$81
1850VPW ECU1 SID\$09 INF\$06 9 M9	\$48 \$6B \$10 \$49 \$06 \$09 \$1F \$FF \$00 \$80
1850VPW ECU1 SID\$09 INF\$07 832	\$48 \$6B \$10 \$49 \$07 \$08
1850VPW ECU1 SID\$09 INF\$07 840	\$48 \$6B \$10 \$49 \$07 \$0A
1850VPW ECU1 SID\$09 INF\$07 B32	\$48 \$6B \$10 \$49 \$07 \$08
1850VPW ECU1 SID\$09 INF\$07 B36	\$48 \$6B \$10 \$49 \$07 \$09
1850VPW ECU1 SID\$09 INF\$08 32 M1	\$48 \$6B \$10 \$49 \$08 \$01 \$00 \$64 \$00 \$69
1850VPW ECU1 SID\$09 INF\$08 32 M2	\$48 \$6B \$10 \$49 \$08 \$02 \$00 \$0A \$00 \$0F
1850VPW ECU1 SID\$09 INF\$08 32 M3	\$48 \$6B \$10 \$49 \$08 \$03 \$00 \$00 \$00 \$00
1850VPW ECU1 SID\$09 INF\$08 32 M4	\$48 \$6B \$10 \$49 \$08 \$04 \$00 \$1E \$00 \$23
1850VPW ECU1 SID\$09 INF\$08 32 M5	\$48 \$6B \$10 \$49 \$08 \$05 \$00 \$00 \$00 \$00
1850VPW ECU1 SID\$09 INF\$08 32 M6	\$48 \$6B \$10 \$49 \$08 \$06 \$00 \$32 \$00 \$37
1850VPW ECU1 SID\$09 INF\$08 32 M7	\$48 \$6B \$10 \$49 \$08 \$07 \$00 \$3C \$00 \$41
1850VPW ECU1 SID\$09 INF\$08 32 M8	\$48 \$6B \$10 \$49 \$08 \$08 \$00 \$46 \$00 \$4B
1850VPW ECU1 SID\$09 INF\$08 40 M1	\$48 \$6B \$10 \$49 \$08 \$01 \$00 \$64 \$00 \$69
1850VPW ECU1 SID\$09 INF\$08 40 M2	\$48 \$6B \$10 \$49 \$08 \$02 \$00 \$0A \$00 \$0F
1850VPW ECU1 SID\$09 INF\$08 40 M3	\$48 \$6B \$10 \$49 \$08 \$03 \$00 \$00 \$00 \$00
1850VPW ECU1 SID\$09 INF\$08 40 M4	\$48 \$6B \$10 \$49 \$08 \$04 \$00 \$1E \$00 \$23
1850VPW ECU1 SID\$09 INF\$08 40 M5	\$48 \$6B \$10 \$49 \$08 \$05 \$00 \$00 \$00 \$00
1850VPW ECU1 SID\$09 INF\$08 40 M6	\$48 \$6B \$10 \$49 \$08 \$06 \$00 \$32 \$00 \$37
1850VPW ECU1 SID\$09 INF\$08 40 M7	\$48 \$6B \$10 \$49 \$08 \$07 \$00 \$3C \$00 \$41
1850VPW ECU1 SID\$09 INF\$08 40 M8	\$48 \$6B \$10 \$49 \$08 \$08 \$00 \$46 \$00 \$4B
1850VPW ECU1 SID\$09 INF\$08 40 M9	\$48 \$6B \$10 \$49 \$08 \$09 \$00 \$5A \$00 \$5F
1850VPW ECU1 SID\$09 INF\$08 40 M10	\$48 \$6B \$10 \$49 \$08 \$0A \$00 \$00 \$00 \$00
1850VPW ECU1 SID\$09 INF\$0B 32 M1	\$48 \$6B \$10 \$49 \$0B \$01 \$00 \$64 \$00 \$69
1850VPW ECU1 SID\$09 INF\$0B 32 M2	\$48 \$6B \$10 \$49 \$0B \$02 \$00 \$0A \$00 \$0F
1850VPW ECU1 SID\$09 INF\$0B 32 M3	\$48 \$6B \$10 \$49 \$0B \$03 \$00 \$00 \$00 \$00
1850VPW ECU1 SID\$09 INF\$0B 32 M4	\$48 \$6B \$10 \$49 \$0B \$04 \$00 \$00 \$00 \$00
1850VPW ECU1 SID\$09 INF\$0B 32 M5	\$48 \$6B \$10 \$49 \$0B \$05 \$00 \$00 \$00 \$00

1850VPW ECU1 SID\$09 INF\$0B 32 M6	\$48 \$6B \$10 \$49 \$0B \$06 \$00 \$32 \$00 \$37
1850VPW ECU1 SID\$09 INF\$0B 32 M7	\$48 \$6B \$10 \$49 \$0B \$07 \$00 \$3C \$00 \$41
1850VPW ECU1 SID\$09 INF\$0B 32 M8	\$48 \$6B \$10 \$49 \$0B \$08 \$00 \$46 \$00 \$4B
1850VPW ECU1 SID\$09 INF\$0B 36 M1	\$48 \$6B \$10 \$49 \$0B \$01 \$00 \$64 \$00 \$69
1850VPW ECU1 SID\$09 INF\$0B 36 M2	\$48 \$6B \$10 \$49 \$0B \$02 \$00 \$0A \$00 \$0F
1850VPW ECU1 SID\$09 INF\$0B 36 M3	\$48 \$6B \$10 \$49 \$0B \$03 \$00 \$00 \$00 \$00
1850VPW ECU1 SID\$09 INF\$0B 36 M4	\$48 \$6B \$10 \$49 \$0B \$04 \$00 \$00 \$00 \$00
1850VPW ECU1 SID\$09 INF\$0B 36 M5	\$48 \$6B \$10 \$49 \$0B \$05 \$00 \$00 \$00 \$00
1850VPW ECU1 SID\$09 INF\$0B 36 M6	\$48 \$6B \$10 \$49 \$0B \$06 \$00 \$32 \$00 \$37
1850VPW ECU1 SID\$09 INF\$0B 36 M7	\$48 \$6B \$10 \$49 \$0B \$07 \$00 \$3C \$00 \$41
1850VPW ECU1 SID\$09 INF\$0B 36 M8	\$48 \$6B \$10 \$49 \$0B \$08 \$00 \$46 \$00 \$4B
1850VPW ECU1 SID\$09 INF\$0B 36 M9	\$48 \$6B \$10 \$49 \$0B \$09 \$00 \$50 \$00 \$55
1850VPW ECU1 SID\$09 NRC78	\$48 \$6B \$10 \$7F \$49 \$78
1850VPW ECU2 SID\$09 INF\$00	\$48 \$6B \$11 \$49 \$00 \$3F \$00 \$00 \$00
1850VPW ECU2 SID\$09 INF\$00 DIESEL	\$48 \$6B \$11 \$49 \$00 \$3E \$20 \$00 \$00
1850VPW ECU2 SID\$09 INF\$03	\$48 \$6B \$11 \$49 \$03 \$04
1850VPW ECU2 SID\$09 INF\$03 9	\$48 \$6B \$11 \$49 \$03 \$24
1850VPW ECU2 SID\$09 INF\$04 M1	\$48 \$6B \$11 \$49 \$04 \$01 \$32 \$34 \$32 \$32
1850VPW ECU2 SID\$09 INF\$04 M2	\$48 \$6B \$11 \$49 \$04 \$02 \$31 \$34 \$31 \$39
1850VPW ECU2 SID\$09 INF\$04 M3	\$48 \$6B \$11 \$49 \$04 \$03 \$00 \$00 \$00 \$00
1850VPW ECU2 SID\$09 INF\$04 M4	\$48 \$6B \$11 \$49 \$04 \$04 \$00 \$00 \$00 \$00
1850VPW ECU2 SID\$09 INF\$04 9 M1	\$48 \$6B \$11 \$49 \$04 \$01 \$31 \$32 \$35 \$38
1850VPW ECU2 SID\$09 INF\$04 9 M2	\$48 \$6B \$11 \$49 \$04 \$02 \$39 \$37 \$37 \$38
1850VPW ECU2 SID\$09 INF\$04 9 M3	\$48 \$6B \$11 \$49 \$04 \$03 \$00 \$00 \$00 \$00
1850VPW ECU2 SID\$09 INF\$04 9 M4	\$48 \$6B \$11 \$49 \$04 \$04 \$00 \$00 \$00 \$00
1850VPW ECU2 SID\$09 INF\$04 9 M5	\$48 \$6B \$11 \$49 \$04 \$05 \$32 \$32 \$35 \$38
1850VPW ECU2 SID\$09 INF\$04 9 M6	\$48 \$6B \$11 \$49 \$04 \$06 \$39 \$37 \$37 \$37
1850VPW ECU2 SID\$09 INF\$04 9 M7	\$48 \$6B \$11 \$49 \$04 \$07 \$00 \$00 \$00 \$00
1850VPW ECU2 SID\$09 INF\$04 9 M8	\$48 \$6B \$11 \$49 \$04 \$08 \$00 \$00 \$00 \$00
1850VPW ECU2 SID\$09 INF\$04 9 M9	\$48 \$6B \$11 \$49 \$04 \$09 \$33 \$32 \$35 \$38
1850VPW ECU2 SID\$09 INF\$04 9 M10	\$48 \$6B \$11 \$49 \$04 \$0A \$39 \$37 \$37 \$36
1850VPW ECU2 SID\$09 INF\$04 9 M11	\$48 \$6B \$11 \$49 \$04 \$0B \$00 \$00 \$00 \$00
1850VPW ECU2 SID\$09 INF\$04 9 M12	\$48 \$6B \$11 \$49 \$04 \$0C \$00 \$00 \$00 \$00
1850VPW ECU2 SID\$09 INF\$04 9 M13	\$48 \$6B \$11 \$49 \$04 \$0D \$34 \$32 \$35 \$38
1850VPW ECU2 SID\$09 INF\$04 9 M14	\$48 \$6B \$11 \$49 \$04 \$0E \$39 \$37 \$37 \$35
1850VPW ECU2 SID\$09 INF\$04 9 M15	\$48 \$6B \$11 \$49 \$04 \$0F \$00 \$00 \$00 \$00
1850VPW ECU2 SID\$09 INF\$04 9 M16	\$48 \$6B \$11 \$49 \$04 \$10 \$00 \$00 \$00 \$00
1850VPW ECU2 SID\$09 INF\$04 9 M17	\$48 \$6B \$11 \$49 \$04 \$11 \$35 \$32 \$35 \$38
1850VPW ECU2 SID\$09 INF\$04 9 M18	\$48 \$6B \$11 \$49 \$04 \$12 \$39 \$37 \$37 \$34
1850VPW ECU2 SID\$09 INF\$04 9 M19	\$48 \$6B \$11 \$49 \$04 \$13 \$00 \$00 \$00 \$00
1850VPW ECU2 SID\$09 INF\$04 9 M20	\$48 \$6B \$11 \$49 \$04 \$14 \$00 \$00 \$00 \$00
1850VPW ECU2 SID\$09 INF\$04 9 M21	\$48 \$6B \$11 \$49 \$04 \$15 \$36 \$32 \$35 \$38
1850VPW ECU2 SID\$09 INF\$04 9 M22	\$48 \$6B \$11 \$49 \$04 \$16 \$39 \$37 \$37 \$33
1850VPW ECU2 SID\$09 INF\$04 9 M23	\$48 \$6B \$11 \$49 \$04 \$17 \$00 \$00 \$00 \$00
1850VPW ECU2 SID\$09 INF\$04 9 M24	\$48 \$6B \$11 \$49 \$04 \$18 \$00 \$00 \$00 \$00
1850VPW ECU2 SID\$09 INF\$04 9 M25	\$48 \$6B \$11 \$49 \$04 \$19 \$37 \$32 \$35 \$38
1850VPW ECU2 SID\$09 INF\$04 9 M26	\$48 \$6B \$11 \$49 \$04 \$1A \$39 \$37 \$37 \$32
1850VPW ECU2 SID\$09 INF\$04 9 M27	\$48 \$6B \$11 \$49 \$04 \$1B \$00 \$00 \$00 \$00
1850VPW ECU2 SID\$09 INF\$04 9 M28	\$48 \$6B \$11 \$49 \$04 \$1C \$00 \$00 \$00 \$00
1850VPW ECU2 SID\$09 INF\$04 9 M29	\$48 \$6B \$11 \$49 \$04 \$1D \$38 \$32 \$35 \$38
1850VPW ECU2 SID\$09 INF\$04 9 M30	\$48 \$6B \$11 \$49 \$04 \$1E \$39 \$37 \$37 \$31
1850VPW ECU2 SID\$09 INF\$04 9 M31	\$48 \$6B \$11 \$49 \$04 \$1F \$00 \$00 \$00 \$00
1850VPW ECU2 SID\$09 INF\$04 9 M32	\$48 \$6B \$11 \$49 \$04 \$20 \$00 \$00 \$00 \$00
1850VPW ECU2 SID\$09 INF\$04 9 M33	\$48 \$6B \$11 \$49 \$04 \$21 \$39 \$32 \$35 \$38
1850VPW ECU2 SID\$09 INF\$04 9 M34	\$48 \$6B \$11 \$49 \$04 \$22 \$39 \$37 \$37 \$30
1850VPW ECU2 SID\$09 INF\$04 9 M35	\$48 \$6B \$11 \$49 \$04 \$23 \$00 \$00 \$00 \$00
1850VPW ECU2 SID\$09 INF\$04 9 M36	\$48 \$6B \$11 \$49 \$04 \$24 \$00 \$00 \$00 \$00
1850VPW ECU2 SID\$09 INF\$05	\$48 \$6B \$11 \$49 \$05 \$01

1850VPW ECU2 SID\$09 INF\$05 9	\$48 \$6B \$11 \$49 \$05 \$09
1850VPW ECU2 SID\$09 INF\$06	\$48 \$6B \$11 \$49 \$06 \$01 \$27 \$91 \$BC \$88
1850VPW ECU2 SID\$09 INF\$06 9 M1	\$48 \$6B \$11 \$49 \$06 \$01 \$27 \$91 \$BC \$88
1850VPW ECU2 SID\$09 INF\$06 9 M2	\$48 \$6B \$11 \$49 \$06 \$02 \$28 \$91 \$BC \$87
1850VPW ECU2 SID\$09 INF\$06 9 M3	\$48 \$6B \$11 \$49 \$06 \$03 \$29 \$91 \$BC \$86
1850VPW ECU2 SID\$09 INF\$06 9 M4	\$48 \$6B \$11 \$49 \$06 \$04 \$2A \$91 \$BC \$85
1850VPW ECU2 SID\$09 INF\$06 9 M5	\$48 \$6B \$11 \$49 \$06 \$05 \$2B \$91 \$BC \$84
1850VPW ECU2 SID\$09 INF\$06 9 M6	\$48 \$6B \$11 \$49 \$06 \$06 \$2C \$91 \$BC \$83
1850VPW ECU2 SID\$09 INF\$06 9 M7	\$48 \$6B \$11 \$49 \$06 \$07 \$2D \$91 \$BC \$82
1850VPW ECU2 SID\$09 INF\$06 9 M8	\$48 \$6B \$11 \$49 \$06 \$08 \$2E \$55 \$AA \$81
1850VPW ECU2 SID\$09 INF\$06 9 M9	\$48 \$6B \$11 \$49 \$06 \$09 \$2F \$FF \$00 \$80
1850VPW ECU2 SID\$09 INF\$07 832	\$48 \$6B \$11 \$49 \$07 \$08
1850VPW ECU2 SID\$09 INF\$07 840	\$48 \$6B \$11 \$49 \$07 \$0A
1850VPW ECU2 SID\$09 INF\$07 B32	\$48 \$6B \$11 \$49 \$07 \$08
1850VPW ECU2 SID\$09 INF\$07 B36	\$48 \$6B \$11 \$49 \$07 \$09
1850VPW ECU2 SID\$09 INF\$08 32 M1	\$48 \$6B \$11 \$49 \$08 \$01 \$00 \$64 \$00 \$69
1850VPW ECU2 SID\$09 INF\$08 32 M2	\$48 \$6B \$11 \$49 \$08 \$02 \$00 \$00 \$00 \$00
1850VPW ECU2 SID\$09 INF\$08 32 M3	\$48 \$6B \$11 \$49 \$08 \$03 \$00 \$14 \$00 \$19
1850VPW ECU2 SID\$09 INF\$08 32 M4	\$48 \$6B \$11 \$49 \$08 \$04 \$00 \$00 \$00 \$00
1850VPW ECU2 SID\$09 INF\$08 32 M5	\$48 \$6B \$11 \$49 \$08 \$05 \$00 \$28 \$00 \$2D
1850VPW ECU2 SID\$09 INF\$08 32 M6	\$48 \$6B \$11 \$49 \$08 \$06 \$00 \$00 \$00 \$00
1850VPW ECU2 SID\$09 INF\$08 32 M7	\$48 \$6B \$11 \$49 \$08 \$07 \$00 \$00 \$00 \$00
1850VPW ECU2 SID\$09 INF\$08 32 M8	\$48 \$6B \$11 \$49 \$08 \$08 \$00 \$00 \$00 \$00
1850VPW ECU2 SID\$09 INF\$08 40 M1	\$48 \$6B \$11 \$49 \$08 \$01 \$00 \$64 \$00 \$69
1850VPW ECU2 SID\$09 INF\$08 40 M2	\$48 \$6B \$11 \$49 \$08 \$02 \$00 \$00 \$00 \$00
1850VPW ECU2 SID\$09 INF\$08 40 M3	\$48 \$6B \$11 \$49 \$08 \$03 \$00 \$14 \$00 \$19
1850VPW ECU2 SID\$09 INF\$08 40 M4	\$48 \$6B \$11 \$49 \$08 \$04 \$00 \$00 \$00 \$00
1850VPW ECU2 SID\$09 INF\$08 40 M5	\$48 \$6B \$11 \$49 \$08 \$05 \$00 \$28 \$00 \$2D
1850VPW ECU2 SID\$09 INF\$08 40 M6	\$48 \$6B \$11 \$49 \$08 \$06 \$00 \$00 \$00 \$00
1850VPW ECU2 SID\$09 INF\$08 40 M7	\$48 \$6B \$11 \$49 \$08 \$07 \$00 \$00 \$00 \$00
1850VPW ECU2 SID\$09 INF\$08 40 M8	\$48 \$6B \$11 \$49 \$08 \$08 \$00 \$00 \$00 \$00
1850VPW ECU2 SID\$09 INF\$08 40 M9	\$48 \$6B \$11 \$49 \$08 \$09 \$00 \$00 \$00 \$00
1850VPW ECU2 SID\$09 INF\$08 40 M10	\$48 \$6B \$11 \$49 \$08 \$0A \$00 \$5A \$00 \$5F
1850VPW ECU2 SID\$09 INF\$0B 32 M1	\$48 \$6B \$11 \$49 \$0B \$01 \$00 \$64 \$00 \$69
1850VPW ECU2 SID\$09 INF\$0B 32 M2	\$48 \$6B \$11 \$49 \$0B \$02 \$00 \$00 \$00 \$00
1850VPW ECU2 SID\$09 INF\$0B 32 M3	\$48 \$6B \$11 \$49 \$0B \$03 \$00 \$14 \$00 \$19
1850VPW ECU2 SID\$09 INF\$0B 32 M4	\$48 \$6B \$11 \$49 \$0B \$04 \$00 \$00 \$00 \$00
1850VPW ECU2 SID\$09 INF\$0B 32 M5	\$48 \$6B \$11 \$49 \$0B \$05 \$00 \$28 \$00 \$2D
1850VPW ECU2 SID\$09 INF\$0B 32 M6	\$48 \$6B \$11 \$49 \$0B \$06 \$00 \$00 \$00 \$00
1850VPW ECU2 SID\$09 INF\$0B 32 M7	\$48 \$6B \$11 \$49 \$0B \$07 \$00 \$00 \$00 \$00
1850VPW ECU2 SID\$09 INF\$0B 32 M8	\$48 \$6B \$11 \$49 \$0B \$08 \$00 \$00 \$00 \$00
1850VPW ECU2 SID\$09 INF\$0B 36 M1	\$48 \$6B \$11 \$49 \$0B \$01 \$00 \$64 \$00 \$69
1850VPW ECU2 SID\$09 INF\$0B 36 M2	\$48 \$6B \$11 \$49 \$0B \$02 \$00 \$00 \$00 \$00
1850VPW ECU2 SID\$09 INF\$0B 36 M3	\$48 \$6B \$11 \$49 \$0B \$03 \$00 \$14 \$00 \$19
1850VPW ECU2 SID\$09 INF\$0B 36 M4	\$48 \$6B \$11 \$49 \$0B \$04 \$00 \$00 \$00 \$00
1850VPW ECU2 SID\$09 INF\$0B 36 M5	\$48 \$6B \$11 \$49 \$0B \$05 \$00 \$28 \$00 \$2D
1850VPW ECU2 SID\$09 INF\$0B 36 M6	\$48 \$6B \$11 \$49 \$0B \$06 \$00 \$00 \$00 \$00
1850VPW ECU2 SID\$09 INF\$0B 36 M7	\$48 \$6B \$11 \$49 \$0B \$07 \$00 \$00 \$00 \$00
1850VPW ECU2 SID\$09 INF\$0B 36 M8	\$48 \$6B \$11 \$49 \$0B \$08 \$00 \$00 \$00 \$00
1850VPW ECU2 SID\$09 INF\$0B 36 M9	\$48 \$6B \$11 \$49 \$0B \$09 \$00 \$00 \$00 \$00
1850VPW ECU3 SID\$09 INF\$00	\$48 \$6B \$12 \$49 \$00 \$3C \$00 \$00 \$00
1850VPW ECU3 SID\$09 INF\$03 9	\$48 \$6B \$12 \$49 \$03 \$24
1850VPW ECU3 SID\$09 INF\$04 9 M1	\$48 \$6B \$12 \$49 \$04 \$01 \$31 \$33 \$35 \$38
1850VPW ECU3 SID\$09 INF\$04 9 M2	\$48 \$6B \$12 \$49 \$04 \$02 \$39 \$37 \$37 \$38
1850VPW ECU3 SID\$09 INF\$04 9 M3	\$48 \$6B \$12 \$49 \$04 \$03 \$00 \$00 \$00 \$00
1850VPW ECU3 SID\$09 INF\$04 9 M4	\$48 \$6B \$12 \$49 \$04 \$04 \$00 \$00 \$00 \$00
1850VPW ECU3 SID\$09 INF\$04 9 M5	\$48 \$6B \$12 \$49 \$04 \$05 \$32 \$33 \$35 \$38
1850VPW ECU3 SID\$09 INF\$04 9 M6	\$48 \$6B \$12 \$49 \$04 \$06 \$39 \$37 \$37 \$37

1850VPW ECU3 SID\$09 INF\$04 9 M7	\$48 \$6B \$12 \$49 \$04 \$07 \$00 \$00 \$00 \$00
1850VPW ECU3 SID\$09 INF\$04 9 M8	\$48 \$6B \$12 \$49 \$04 \$08 \$00 \$00 \$00 \$00
1850VPW ECU3 SID\$09 INF\$04 9 M9	\$48 \$6B \$12 \$49 \$04 \$09 \$33 \$33 \$35 \$38
1850VPW ECU3 SID\$09 INF\$04 9 M10	\$48 \$6B \$12 \$49 \$04 \$0A \$39 \$37 \$37 \$36
1850VPW ECU3 SID\$09 INF\$04 9 M11	\$48 \$6B \$12 \$49 \$04 \$0B \$00 \$00 \$00 \$00
1850VPW ECU3 SID\$09 INF\$04 9 M12	\$48 \$6B \$12 \$49 \$04 \$0C \$00 \$00 \$00 \$00
1850VPW ECU3 SID\$09 INF\$04 9 M13	\$48 \$6B \$12 \$49 \$04 \$0D \$34 \$33 \$35 \$38
1850VPW ECU3 SID\$09 INF\$04 9 M14	\$48 \$6B \$12 \$49 \$04 \$0E \$39 \$37 \$37 \$35
1850VPW ECU3 SID\$09 INF\$04 9 M15	\$48 \$6B \$12 \$49 \$04 \$0F \$00 \$00 \$00 \$00
1850VPW ECU3 SID\$09 INF\$04 9 M16	\$48 \$6B \$12 \$49 \$04 \$10 \$00 \$00 \$00 \$00
1850VPW ECU3 SID\$09 INF\$04 9 M17	\$48 \$6B \$12 \$49 \$04 \$11 \$35 \$33 \$35 \$38
1850VPW ECU3 SID\$09 INF\$04 9 M18	\$48 \$6B \$12 \$49 \$04 \$12 \$39 \$37 \$37 \$34
1850VPW ECU3 SID\$09 INF\$04 9 M19	\$48 \$6B \$12 \$49 \$04 \$13 \$00 \$00 \$00 \$00
1850VPW ECU3 SID\$09 INF\$04 9 M20	\$48 \$6B \$12 \$49 \$04 \$14 \$00 \$00 \$00 \$00
1850VPW ECU3 SID\$09 INF\$04 9 M21	\$48 \$6B \$12 \$49 \$04 \$15 \$36 \$33 \$35 \$38
1850VPW ECU3 SID\$09 INF\$04 9 M22	\$48 \$6B \$12 \$49 \$04 \$16 \$39 \$37 \$37 \$33
1850VPW ECU3 SID\$09 INF\$04 9 M23	\$48 \$6B \$12 \$49 \$04 \$17 \$00 \$00 \$00 \$00
1850VPW ECU3 SID\$09 INF\$04 9 M24	\$48 \$6B \$12 \$49 \$04 \$18 \$00 \$00 \$00 \$00
1850VPW ECU3 SID\$09 INF\$04 9 M25	\$48 \$6B \$12 \$49 \$04 \$19 \$37 \$33 \$35 \$38
1850VPW ECU3 SID\$09 INF\$04 9 M26	\$48 \$6B \$12 \$49 \$04 \$1A \$39 \$37 \$37 \$32
1850VPW ECU3 SID\$09 INF\$04 9 M27	\$48 \$6B \$12 \$49 \$04 \$1B \$00 \$00 \$00 \$00
1850VPW ECU3 SID\$09 INF\$04 9 M28	\$48 \$6B \$12 \$49 \$04 \$1C \$00 \$00 \$00 \$00
1850VPW ECU3 SID\$09 INF\$04 9 M29	\$48 \$6B \$12 \$49 \$04 \$1D \$38 \$33 \$35 \$38
1850VPW ECU3 SID\$09 INF\$04 9 M30	\$48 \$6B \$12 \$49 \$04 \$1E \$39 \$37 \$37 \$31
1850VPW ECU3 SID\$09 INF\$04 9 M31	\$48 \$6B \$12 \$49 \$04 \$1F \$00 \$00 \$00 \$00
1850VPW ECU3 SID\$09 INF\$04 9 M32	\$48 \$6B \$12 \$49 \$04 \$20 \$00 \$00 \$00 \$00
1850VPW ECU3 SID\$09 INF\$04 9 M33	\$48 \$6B \$12 \$49 \$04 \$21 \$39 \$33 \$35 \$38
1850VPW ECU3 SID\$09 INF\$04 9 M34	\$48 \$6B \$12 \$49 \$04 \$22 \$39 \$37 \$37 \$30
1850VPW ECU3 SID\$09 INF\$04 9 M35	\$48 \$6B \$12 \$49 \$04 \$23 \$00 \$00 \$00 \$00
1850VPW ECU3 SID\$09 INF\$04 9 M36	\$48 \$6B \$12 \$49 \$04 \$24 \$00 \$00 \$00 \$00
1850VPW ECU3 SID\$09 INF\$05 9	\$48 \$6B \$12 \$49 \$05 \$09
1850VPW ECU3 SID\$09 INF\$06 9 M1	\$48 \$6B \$12 \$49 \$06 \$01 \$37 \$91 \$BC \$88
1850VPW ECU3 SID\$09 INF\$06 9 M2	\$48 \$6B \$12 \$49 \$06 \$02 \$38 \$91 \$BC \$87
1850VPW ECU3 SID\$09 INF\$06 9 M3	\$48 \$6B \$12 \$49 \$06 \$03 \$39 \$91 \$BC \$86
1850VPW ECU3 SID\$09 INF\$06 9 M4	\$48 \$6B \$12 \$49 \$06 \$04 \$3A \$91 \$BC \$85
1850VPW ECU3 SID\$09 INF\$06 9 M5	\$48 \$6B \$12 \$49 \$06 \$05 \$3B \$91 \$BC \$84
1850VPW ECU3 SID\$09 INF\$06 9 M6	\$48 \$6B \$12 \$49 \$06 \$06 \$3C \$91 \$BC \$83
1850VPW ECU3 SID\$09 INF\$06 9 M7	\$48 \$6B \$12 \$49 \$06 \$07 \$3D \$91 \$BC \$82
1850VPW ECU3 SID\$09 INF\$06 9 M8	\$48 \$6B \$12 \$49 \$06 \$08 \$3E \$55 \$AA \$81
1850VPW ECU3 SID\$09 INF\$06 9 M9	\$48 \$6B \$12 \$49 \$06 \$09 \$3F \$FF \$00 \$80
1850VPW ECU4 SID\$09 INF\$00	\$48 \$6B \$13 \$49 \$00 \$3C \$00 \$00 \$00
1850VPW ECU4 SID\$09 INF\$03 9	\$48 \$6B \$13 \$49 \$03 \$24
1850VPW ECU4 SID\$09 INF\$04 9 M1	\$48 \$6B \$13 \$49 \$04 \$01 \$31 \$34 \$35 \$38
1850VPW ECU4 SID\$09 INF\$04 9 M2	\$48 \$6B \$13 \$49 \$04 \$02 \$39 \$37 \$37 \$38
1850VPW ECU4 SID\$09 INF\$04 9 M3	\$48 \$6B \$13 \$49 \$04 \$03 \$00 \$00 \$00 \$00
1850VPW ECU4 SID\$09 INF\$04 9 M4	\$48 \$6B \$13 \$49 \$04 \$04 \$00 \$00 \$00 \$00
1850VPW ECU4 SID\$09 INF\$04 9 M5	\$48 \$6B \$13 \$49 \$04 \$05 \$32 \$34 \$35 \$38
1850VPW ECU4 SID\$09 INF\$04 9 M6	\$48 \$6B \$13 \$49 \$04 \$06 \$39 \$37 \$37 \$37
1850VPW ECU4 SID\$09 INF\$04 9 M7	\$48 \$6B \$13 \$49 \$04 \$07 \$00 \$00 \$00 \$00
1850VPW ECU4 SID\$09 INF\$04 9 M8	\$48 \$6B \$13 \$49 \$04 \$08 \$00 \$00 \$00 \$00
1850VPW ECU4 SID\$09 INF\$04 9 M9	\$48 \$6B \$13 \$49 \$04 \$09 \$33 \$34 \$35 \$38
1850VPW ECU4 SID\$09 INF\$04 9 M10	\$48 \$6B \$13 \$49 \$04 \$0A \$39 \$37 \$37 \$36
1850VPW ECU4 SID\$09 INF\$04 9 M11	\$48 \$6B \$13 \$49 \$04 \$0B \$00 \$00 \$00 \$00
1850VPW ECU4 SID\$09 INF\$04 9 M12	\$48 \$6B \$13 \$49 \$04 \$0C \$00 \$00 \$00 \$00
1850VPW ECU4 SID\$09 INF\$04 9 M13	\$48 \$6B \$13 \$49 \$04 \$0D \$34 \$34 \$35 \$38
1850VPW ECU4 SID\$09 INF\$04 9 M14	\$48 \$6B \$13 \$49 \$04 \$0E \$39 \$37 \$37 \$35
1850VPW ECU4 SID\$09 INF\$04 9 M15	\$48 \$6B \$13 \$49 \$04 \$0F \$00 \$00 \$00 \$00
1850VPW ECU4 SID\$09 INF\$04 9 M16	\$48 \$6B \$13 \$49 \$04 \$10 \$00 \$00 \$00 \$00

1850VPW ECU4 SID\$09 INF\$04 9 M17	\$48 \$6B \$13 \$49 \$04 \$11 \$35 \$34 \$35 \$38
1850VPW ECU4 SID\$09 INF\$04 9 M18	\$48 \$6B \$13 \$49 \$04 \$12 \$39 \$37 \$37 \$34
1850VPW ECU4 SID\$09 INF\$04 9 M19	\$48 \$6B \$13 \$49 \$04 \$13 \$00 \$00 \$00 \$00
1850VPW ECU4 SID\$09 INF\$04 9 M20	\$48 \$6B \$13 \$49 \$04 \$14 \$00 \$00 \$00 \$00
1850VPW ECU4 SID\$09 INF\$04 9 M21	\$48 \$6B \$13 \$49 \$04 \$15 \$36 \$34 \$35 \$38
1850VPW ECU4 SID\$09 INF\$04 9 M22	\$48 \$6B \$13 \$49 \$04 \$16 \$39 \$37 \$37 \$33
1850VPW ECU4 SID\$09 INF\$04 9 M23	\$48 \$6B \$13 \$49 \$04 \$17 \$00 \$00 \$00 \$00
1850VPW ECU4 SID\$09 INF\$04 9 M24	\$48 \$6B \$13 \$49 \$04 \$18 \$00 \$00 \$00 \$00
1850VPW ECU4 SID\$09 INF\$04 9 M25	\$48 \$6B \$13 \$49 \$04 \$19 \$37 \$34 \$35 \$38
1850VPW ECU4 SID\$09 INF\$04 9 M26	\$48 \$6B \$13 \$49 \$04 \$1A \$39 \$37 \$37 \$32
1850VPW ECU4 SID\$09 INF\$04 9 M27	\$48 \$6B \$13 \$49 \$04 \$1B \$00 \$00 \$00 \$00
1850VPW ECU4 SID\$09 INF\$04 9 M28	\$48 \$6B \$13 \$49 \$04 \$1C \$00 \$00 \$00 \$00
1850VPW ECU4 SID\$09 INF\$04 9 M29	\$48 \$6B \$13 \$49 \$04 \$1D \$38 \$34 \$35 \$38
1850VPW ECU4 SID\$09 INF\$04 9 M30	\$48 \$6B \$13 \$49 \$04 \$1E \$39 \$37 \$37 \$31
1850VPW ECU4 SID\$09 INF\$04 9 M31	\$48 \$6B \$13 \$49 \$04 \$1F \$00 \$00 \$00 \$00
1850VPW ECU4 SID\$09 INF\$04 9 M32	\$48 \$6B \$13 \$49 \$04 \$20 \$00 \$00 \$00 \$00
1850VPW ECU4 SID\$09 INF\$04 9 M33	\$48 \$6B \$13 \$49 \$04 \$21 \$39 \$34 \$35 \$38
1850VPW ECU4 SID\$09 INF\$04 9 M34	\$48 \$6B \$13 \$49 \$04 \$22 \$39 \$37 \$37 \$30
1850VPW ECU4 SID\$09 INF\$04 9 M35	\$48 \$6B \$13 \$49 \$04 \$23 \$00 \$00 \$00 \$00
1850VPW ECU4 SID\$09 INF\$04 9 M36	\$48 \$6B \$13 \$49 \$04 \$24 \$00 \$00 \$00 \$00
1850VPW ECU4 SID\$09 INF\$05 9	\$48 \$6B \$13 \$49 \$05 \$09
1850VPW ECU4 SID\$09 INF\$06 9 M1	\$48 \$6B \$13 \$49 \$06 \$01 \$47 \$91 \$BC \$88
1850VPW ECU4 SID\$09 INF\$06 9 M2	\$48 \$6B \$13 \$49 \$06 \$02 \$48 \$91 \$BC \$87
1850VPW ECU4 SID\$09 INF\$06 9 M3	\$48 \$6B \$13 \$49 \$06 \$03 \$49 \$91 \$BC \$86
1850VPW ECU4 SID\$09 INF\$06 9 M4	\$48 \$6B \$13 \$49 \$06 \$04 \$4A \$91 \$BC \$85
1850VPW ECU4 SID\$09 INF\$06 9 M5	\$48 \$6B \$13 \$49 \$06 \$05 \$4B \$91 \$BC \$84
1850VPW ECU4 SID\$09 INF\$06 9 M6	\$48 \$6B \$13 \$49 \$06 \$06 \$4C \$91 \$BC \$83
1850VPW ECU4 SID\$09 INF\$06 9 M7	\$48 \$6B \$13 \$49 \$06 \$07 \$4D \$91 \$BC \$82
1850VPW ECU4 SID\$09 INF\$06 9 M8	\$48 \$6B \$13 \$49 \$06 \$08 \$4E \$55 \$AA \$81
1850VPW ECU4 SID\$09 INF\$06 9 M9	\$48 \$6B \$13 \$49 \$06 \$09 \$4F \$FF \$00 \$80
1850VPW ECU5 SID\$09 INF\$00	\$48 \$6B \$14 \$49 \$00 \$3C \$00 \$00 \$00
1850VPW ECU5 SID\$09 INF\$03 9	\$48 \$6B \$14 \$49 \$03 \$24
1850VPW ECU5 SID\$09 INF\$04 9 M1	\$48 \$6B \$14 \$49 \$04 \$01 \$31 \$35 \$35 \$38
1850VPW ECU5 SID\$09 INF\$04 9 M2	\$48 \$6B \$14 \$49 \$04 \$02 \$39 \$37 \$37 \$38
1850VPW ECU5 SID\$09 INF\$04 9 M3	\$48 \$6B \$14 \$49 \$04 \$03 \$00 \$00 \$00 \$00
1850VPW ECU5 SID\$09 INF\$04 9 M4	\$48 \$6B \$14 \$49 \$04 \$04 \$00 \$00 \$00 \$00
1850VPW ECU5 SID\$09 INF\$04 9 M5	\$48 \$6B \$14 \$49 \$04 \$05 \$32 \$35 \$35 \$38
1850VPW ECU5 SID\$09 INF\$04 9 M6	\$48 \$6B \$14 \$49 \$04 \$06 \$39 \$37 \$37 \$37
1850VPW ECU5 SID\$09 INF\$04 9 M7	\$48 \$6B \$14 \$49 \$04 \$07 \$00 \$00 \$00 \$00
1850VPW ECU5 SID\$09 INF\$04 9 M8	\$48 \$6B \$14 \$49 \$04 \$08 \$00 \$00 \$00 \$00
1850VPW ECU5 SID\$09 INF\$04 9 M9	\$48 \$6B \$14 \$49 \$04 \$09 \$33 \$35 \$35 \$38
1850VPW ECU5 SID\$09 INF\$04 9 M10	\$48 \$6B \$14 \$49 \$04 \$0A \$39 \$37 \$37 \$36
1850VPW ECU5 SID\$09 INF\$04 9 M11	\$48 \$6B \$14 \$49 \$04 \$0B \$00 \$00 \$00 \$00
1850VPW ECU5 SID\$09 INF\$04 9 M12	\$48 \$6B \$14 \$49 \$04 \$0C \$00 \$00 \$00 \$00
1850VPW ECU5 SID\$09 INF\$04 9 M13	\$48 \$6B \$14 \$49 \$04 \$0D \$34 \$35 \$35 \$38
1850VPW ECU5 SID\$09 INF\$04 9 M14	\$48 \$6B \$14 \$49 \$04 \$0E \$39 \$37 \$37 \$35
1850VPW ECU5 SID\$09 INF\$04 9 M15	\$48 \$6B \$14 \$49 \$04 \$0F \$00 \$00 \$00 \$00
1850VPW ECU5 SID\$09 INF\$04 9 M16	\$48 \$6B \$14 \$49 \$04 \$10 \$00 \$00 \$00 \$00
1850VPW ECU5 SID\$09 INF\$04 9 M17	\$48 \$6B \$14 \$49 \$04 \$11 \$35 \$35 \$35 \$38
1850VPW ECU5 SID\$09 INF\$04 9 M18	\$48 \$6B \$14 \$49 \$04 \$12 \$39 \$37 \$37 \$34
1850VPW ECU5 SID\$09 INF\$04 9 M19	\$48 \$6B \$14 \$49 \$04 \$13 \$00 \$00 \$00 \$00
1850VPW ECU5 SID\$09 INF\$04 9 M20	\$48 \$6B \$14 \$49 \$04 \$14 \$00 \$00 \$00 \$00
1850VPW ECU5 SID\$09 INF\$04 9 M21	\$48 \$6B \$14 \$49 \$04 \$15 \$36 \$35 \$35 \$38
1850VPW ECU5 SID\$09 INF\$04 9 M22	\$48 \$6B \$14 \$49 \$04 \$16 \$39 \$37 \$37 \$33
1850VPW ECU5 SID\$09 INF\$04 9 M23	\$48 \$6B \$14 \$49 \$04 \$17 \$00 \$00 \$00 \$00
1850VPW ECU5 SID\$09 INF\$04 9 M24	\$48 \$6B \$14 \$49 \$04 \$18 \$00 \$00 \$00 \$00
1850VPW ECU5 SID\$09 INF\$04 9 M25	\$48 \$6B \$14 \$49 \$04 \$19 \$37 \$35 \$35 \$38
1850VPW ECU5 SID\$09 INF\$04 9 M26	\$48 \$6B \$14 \$49 \$04 \$1A \$39 \$37 \$37 \$32

1850VPW ECU5 SID\$09 INF\$04 9 M27	\$48 \$6B \$14 \$49 \$04 \$1B \$00 \$00 \$00 \$00
1850VPW ECU5 SID\$09 INF\$04 9 M28	\$48 \$6B \$14 \$49 \$04 \$1C \$00 \$00 \$00 \$00
1850VPW ECU5 SID\$09 INF\$04 9 M29	\$48 \$6B \$14 \$49 \$04 \$1D \$38 \$35 \$35 \$38
1850VPW ECU5 SID\$09 INF\$04 9 M30	\$48 \$6B \$14 \$49 \$04 \$1E \$39 \$37 \$37 \$31
1850VPW ECU5 SID\$09 INF\$04 9 M31	\$48 \$6B \$14 \$49 \$04 \$1F \$00 \$00 \$00 \$00
1850VPW ECU5 SID\$09 INF\$04 9 M32	\$48 \$6B \$14 \$49 \$04 \$20 \$00 \$00 \$00 \$00
1850VPW ECU5 SID\$09 INF\$04 9 M33	\$48 \$6B \$14 \$49 \$04 \$21 \$39 \$35 \$35 \$38
1850VPW ECU5 SID\$09 INF\$04 9 M34	\$48 \$6B \$14 \$49 \$04 \$22 \$39 \$37 \$37 \$30
1850VPW ECU5 SID\$09 INF\$04 9 M35	\$48 \$6B \$14 \$49 \$04 \$23 \$00 \$00 \$00 \$00
1850VPW ECU5 SID\$09 INF\$04 9 M36	\$48 \$6B \$14 \$49 \$04 \$24 \$00 \$00 \$00 \$00
1850VPW ECU5 SID\$09 INF\$05 9	\$48 \$6B \$14 \$49 \$05 \$09
1850VPW ECU5 SID\$09 INF\$06 9 M1	\$48 \$6B \$14 \$49 \$06 \$01 \$57 \$91 \$BC \$88
1850VPW ECU5 SID\$09 INF\$06 9 M2	\$48 \$6B \$14 \$49 \$06 \$02 \$58 \$91 \$BC \$87
1850VPW ECU5 SID\$09 INF\$06 9 M3	\$48 \$6B \$14 \$49 \$06 \$03 \$59 \$91 \$BC \$86
1850VPW ECU5 SID\$09 INF\$06 9 M4	\$48 \$6B \$14 \$49 \$06 \$04 \$5A \$91 \$BC \$85
1850VPW ECU5 SID\$09 INF\$06 9 M5	\$48 \$6B \$14 \$49 \$06 \$05 \$5B \$91 \$BC \$84
1850VPW ECU5 SID\$09 INF\$06 9 M6	\$48 \$6B \$14 \$49 \$06 \$06 \$5C \$91 \$BC \$83
1850VPW ECU5 SID\$09 INF\$06 9 M7	\$48 \$6B \$14 \$49 \$06 \$07 \$5D \$91 \$BC \$82
1850VPW ECU5 SID\$09 INF\$06 9 M8	\$48 \$6B \$14 \$49 \$06 \$08 \$5E \$55 \$AA \$81
1850VPW ECU5 SID\$09 INF\$06 9 M9	\$48 \$6B \$14 \$49 \$06 \$09 \$5F \$FF \$00 \$80
1850VPW ECU6 SID\$09 INF\$00	\$48 \$6B \$15 \$49 \$00 \$3C \$00 \$00 \$00 \$00
1850VPW ECU6 SID\$09 INF\$03 9	\$48 \$6B \$15 \$49 \$03 \$24
1850VPW ECU6 SID\$09 INF\$04 9 M1	\$48 \$6B \$15 \$49 \$04 \$01 \$31 \$36 \$35 \$38
1850VPW ECU6 SID\$09 INF\$04 9 M2	\$48 \$6B \$15 \$49 \$04 \$02 \$39 \$37 \$37 \$38
1850VPW ECU6 SID\$09 INF\$04 9 M3	\$48 \$6B \$15 \$49 \$04 \$03 \$00 \$00 \$00 \$00
1850VPW ECU6 SID\$09 INF\$04 9 M4	\$48 \$6B \$15 \$49 \$04 \$04 \$00 \$00 \$00 \$00
1850VPW ECU6 SID\$09 INF\$04 9 M5	\$48 \$6B \$15 \$49 \$04 \$05 \$32 \$36 \$35 \$38
1850VPW ECU6 SID\$09 INF\$04 9 M6	\$48 \$6B \$15 \$49 \$04 \$06 \$39 \$37 \$37 \$37
1850VPW ECU6 SID\$09 INF\$04 9 M7	\$48 \$6B \$15 \$49 \$04 \$07 \$00 \$00 \$00 \$00
1850VPW ECU6 SID\$09 INF\$04 9 M8	\$48 \$6B \$15 \$49 \$04 \$08 \$00 \$00 \$00 \$00
1850VPW ECU6 SID\$09 INF\$04 9 M9	\$48 \$6B \$15 \$49 \$04 \$09 \$33 \$36 \$35 \$38
1850VPW ECU6 SID\$09 INF\$04 9 M10	\$48 \$6B \$15 \$49 \$04 \$0A \$39 \$37 \$37 \$36
1850VPW ECU6 SID\$09 INF\$04 9 M11	\$48 \$6B \$15 \$49 \$04 \$0B \$00 \$00 \$00 \$00
1850VPW ECU6 SID\$09 INF\$04 9 M12	\$48 \$6B \$15 \$49 \$04 \$0C \$00 \$00 \$00 \$00
1850VPW ECU6 SID\$09 INF\$04 9 M13	\$48 \$6B \$15 \$49 \$04 \$0D \$34 \$36 \$35 \$38
1850VPW ECU6 SID\$09 INF\$04 9 M14	\$48 \$6B \$15 \$49 \$04 \$0E \$39 \$37 \$37 \$35
1850VPW ECU6 SID\$09 INF\$04 9 M15	\$48 \$6B \$15 \$49 \$04 \$0F \$00 \$00 \$00 \$00
1850VPW ECU6 SID\$09 INF\$04 9 M16	\$48 \$6B \$15 \$49 \$04 \$10 \$00 \$00 \$00 \$00
1850VPW ECU6 SID\$09 INF\$04 9 M17	\$48 \$6B \$15 \$49 \$04 \$11 \$35 \$36 \$35 \$38
1850VPW ECU6 SID\$09 INF\$04 9 M18	\$48 \$6B \$15 \$49 \$04 \$12 \$39 \$37 \$37 \$34
1850VPW ECU6 SID\$09 INF\$04 9 M19	\$48 \$6B \$15 \$49 \$04 \$13 \$00 \$00 \$00 \$00
1850VPW ECU6 SID\$09 INF\$04 9 M20	\$48 \$6B \$15 \$49 \$04 \$14 \$00 \$00 \$00 \$00
1850VPW ECU6 SID\$09 INF\$04 9 M21	\$48 \$6B \$15 \$49 \$04 \$15 \$36 \$36 \$35 \$38
1850VPW ECU6 SID\$09 INF\$04 9 M22	\$48 \$6B \$15 \$49 \$04 \$16 \$39 \$37 \$37 \$33
1850VPW ECU6 SID\$09 INF\$04 9 M23	\$48 \$6B \$15 \$49 \$04 \$17 \$00 \$00 \$00 \$00
1850VPW ECU6 SID\$09 INF\$04 9 M24	\$48 \$6B \$15 \$49 \$04 \$18 \$00 \$00 \$00 \$00
1850VPW ECU6 SID\$09 INF\$04 9 M25	\$48 \$6B \$15 \$49 \$04 \$19 \$37 \$36 \$35 \$38
1850VPW ECU6 SID\$09 INF\$04 9 M26	\$48 \$6B \$15 \$49 \$04 \$1A \$39 \$37 \$37 \$32
1850VPW ECU6 SID\$09 INF\$04 9 M27	\$48 \$6B \$15 \$49 \$04 \$1B \$00 \$00 \$00 \$00
1850VPW ECU6 SID\$09 INF\$04 9 M28	\$48 \$6B \$15 \$49 \$04 \$1C \$00 \$00 \$00 \$00
1850VPW ECU6 SID\$09 INF\$04 9 M29	\$48 \$6B \$15 \$49 \$04 \$1D \$38 \$36 \$35 \$38
1850VPW ECU6 SID\$09 INF\$04 9 M30	\$48 \$6B \$15 \$49 \$04 \$1E \$39 \$37 \$37 \$31
1850VPW ECU6 SID\$09 INF\$04 9 M31	\$48 \$6B \$15 \$49 \$04 \$1F \$00 \$00 \$00 \$00
1850VPW ECU6 SID\$09 INF\$04 9 M32	\$48 \$6B \$15 \$49 \$04 \$20 \$00 \$00 \$00 \$00
1850VPW ECU6 SID\$09 INF\$04 9 M33	\$48 \$6B \$15 \$49 \$04 \$21 \$39 \$36 \$35 \$38
1850VPW ECU6 SID\$09 INF\$04 9 M34	\$48 \$6B \$15 \$49 \$04 \$22 \$39 \$37 \$37 \$30
1850VPW ECU6 SID\$09 INF\$04 9 M35	\$48 \$6B \$15 \$49 \$04 \$23 \$00 \$00 \$00 \$00
1850VPW ECU6 SID\$09 INF\$04 9 M36	\$48 \$6B \$15 \$49 \$04 \$24 \$00 \$00 \$00 \$00

1850VPW ECU6 SID\$09 INF\$05 9	\$48 \$6B \$15 \$49 \$05 \$09
1850VPW ECU6 SID\$09 INF\$06 9 M1	\$48 \$6B \$15 \$49 \$06 \$01 \$67 \$91 \$BC \$88
1850VPW ECU6 SID\$09 INF\$06 9 M2	\$48 \$6B \$15 \$49 \$06 \$02 \$68 \$91 \$BC \$87
1850VPW ECU6 SID\$09 INF\$06 9 M3	\$48 \$6B \$15 \$49 \$06 \$03 \$69 \$91 \$BC \$86
1850VPW ECU6 SID\$09 INF\$06 9 M4	\$48 \$6B \$15 \$49 \$06 \$04 \$6A \$91 \$BC \$85
1850VPW ECU6 SID\$09 INF\$06 9 M5	\$48 \$6B \$15 \$49 \$06 \$05 \$6B \$91 \$BC \$84
1850VPW ECU6 SID\$09 INF\$06 9 M6	\$48 \$6B \$15 \$49 \$06 \$06 \$6C \$91 \$BC \$83
1850VPW ECU6 SID\$09 INF\$06 9 M7	\$48 \$6B \$15 \$49 \$06 \$07 \$6D \$91 \$BC \$82
1850VPW ECU6 SID\$09 INF\$06 9 M8	\$48 \$6B \$15 \$49 \$06 \$08 \$6E \$55 \$AA \$81
1850VPW ECU6 SID\$09 INF\$06 9 M9	\$48 \$6B \$15 \$49 \$06 \$09 \$6F \$FF \$00 \$80
1850VPW ECU7 SID\$09 INF\$00	\$48 \$6B \$16 \$49 \$00 \$3C \$00 \$00 \$00
1850VPW ECU7 SID\$09 INF\$03 9	\$48 \$6B \$16 \$49 \$03 \$24
1850VPW ECU7 SID\$09 INF\$04 9 M1	\$48 \$6B \$16 \$49 \$04 \$01 \$31 \$37 \$35 \$38
1850VPW ECU7 SID\$09 INF\$04 9 M2	\$48 \$6B \$16 \$49 \$04 \$02 \$39 \$37 \$37 \$38
1850VPW ECU7 SID\$09 INF\$04 9 M3	\$48 \$6B \$16 \$49 \$04 \$03 \$00 \$00 \$00 \$00
1850VPW ECU7 SID\$09 INF\$04 9 M4	\$48 \$6B \$16 \$49 \$04 \$04 \$00 \$00 \$00 \$00
1850VPW ECU7 SID\$09 INF\$04 9 M5	\$48 \$6B \$16 \$49 \$04 \$05 \$32 \$37 \$35 \$38
1850VPW ECU7 SID\$09 INF\$04 9 M6	\$48 \$6B \$16 \$49 \$04 \$06 \$39 \$37 \$37 \$37
1850VPW ECU7 SID\$09 INF\$04 9 M7	\$48 \$6B \$16 \$49 \$04 \$07 \$00 \$00 \$00 \$00
1850VPW ECU7 SID\$09 INF\$04 9 M8	\$48 \$6B \$16 \$49 \$04 \$08 \$00 \$00 \$00 \$00
1850VPW ECU7 SID\$09 INF\$04 9 M9	\$48 \$6B \$16 \$49 \$04 \$09 \$33 \$37 \$35 \$38
1850VPW ECU7 SID\$09 INF\$04 9 M10	\$48 \$6B \$16 \$49 \$04 \$0A \$39 \$37 \$37 \$36
1850VPW ECU7 SID\$09 INF\$04 9 M11	\$48 \$6B \$16 \$49 \$04 \$0B \$00 \$00 \$00 \$00
1850VPW ECU7 SID\$09 INF\$04 9 M12	\$48 \$6B \$16 \$49 \$04 \$0C \$00 \$00 \$00 \$00
1850VPW ECU7 SID\$09 INF\$04 9 M13	\$48 \$6B \$16 \$49 \$04 \$0D \$34 \$37 \$35 \$38
1850VPW ECU7 SID\$09 INF\$04 9 M14	\$48 \$6B \$16 \$49 \$04 \$0E \$39 \$37 \$37 \$35
1850VPW ECU7 SID\$09 INF\$04 9 M15	\$48 \$6B \$16 \$49 \$04 \$0F \$00 \$00 \$00 \$00
1850VPW ECU7 SID\$09 INF\$04 9 M16	\$48 \$6B \$16 \$49 \$04 \$10 \$00 \$00 \$00 \$00
1850VPW ECU7 SID\$09 INF\$04 9 M17	\$48 \$6B \$16 \$49 \$04 \$11 \$35 \$37 \$35 \$38
1850VPW ECU7 SID\$09 INF\$04 9 M18	\$48 \$6B \$16 \$49 \$04 \$12 \$39 \$37 \$37 \$34
1850VPW ECU7 SID\$09 INF\$04 9 M19	\$48 \$6B \$16 \$49 \$04 \$13 \$00 \$00 \$00 \$00
1850VPW ECU7 SID\$09 INF\$04 9 M20	\$48 \$6B \$16 \$49 \$04 \$14 \$00 \$00 \$00 \$00
1850VPW ECU7 SID\$09 INF\$04 9 M21	\$48 \$6B \$16 \$49 \$04 \$15 \$36 \$37 \$35 \$38
1850VPW ECU7 SID\$09 INF\$04 9 M22	\$48 \$6B \$16 \$49 \$04 \$16 \$39 \$37 \$37 \$33
1850VPW ECU7 SID\$09 INF\$04 9 M23	\$48 \$6B \$16 \$49 \$04 \$17 \$00 \$00 \$00 \$00
1850VPW ECU7 SID\$09 INF\$04 9 M24	\$48 \$6B \$16 \$49 \$04 \$18 \$00 \$00 \$00 \$00
1850VPW ECU7 SID\$09 INF\$04 9 M25	\$48 \$6B \$16 \$49 \$04 \$19 \$37 \$37 \$35 \$38
1850VPW ECU7 SID\$09 INF\$04 9 M26	\$48 \$6B \$16 \$49 \$04 \$1A \$39 \$37 \$37 \$32
1850VPW ECU7 SID\$09 INF\$04 9 M26	\$48 \$6B \$16 \$49 \$04 \$1B \$00 \$00 \$00 \$00
1850VPW ECU7 SID\$09 INF\$04 9 M28	\$48 \$6B \$16 \$49 \$04 \$1C \$00 \$00 \$00 \$00
1850VPW ECU7 SID\$09 INF\$04 9 M29	\$48 \$6B \$16 \$49 \$04 \$1D \$38 \$37 \$35 \$38
1850VPW ECU7 SID\$09 INF\$04 9 M30	\$48 \$6B \$16 \$49 \$04 \$1E \$39 \$37 \$37 \$31
1850VPW ECU7 SID\$09 INF\$04 9 M31	\$48 \$6B \$16 \$49 \$04 \$1F \$00 \$00 \$00 \$00
1850VPW ECU7 SID\$09 INF\$04 9 M32	\$48 \$6B \$16 \$49 \$04 \$20 \$00 \$00 \$00 \$00
1850VPW ECU7 SID\$09 INF\$04 9 M33	\$48 \$6B \$16 \$49 \$04 \$21 \$39 \$37 \$35 \$38
1850VPW ECU7 SID\$09 INF\$04 9 M34	\$48 \$6B \$16 \$49 \$04 \$22 \$39 \$37 \$37 \$30
1850VPW ECU7 SID\$09 INF\$04 9 M35	\$48 \$6B \$16 \$49 \$04 \$23 \$00 \$00 \$00 \$00
1850VPW ECU7 SID\$09 INF\$04 9 M36	\$48 \$6B \$16 \$49 \$04 \$24 \$00 \$00 \$00 \$00
1850VPW ECU7 SID\$09 INF\$05 9	\$48 \$6B \$16 \$49 \$05 \$09
1850VPW ECU7 SID\$09 INF\$06 9 M1	\$48 \$6B \$16 \$49 \$06 \$01 \$77 \$91 \$BC \$88
1850VPW ECU7 SID\$09 INF\$06 9 M2	\$48 \$6B \$16 \$49 \$06 \$02 \$78 \$91 \$BC \$87
1850VPW ECU7 SID\$09 INF\$06 9 M3	\$48 \$6B \$16 \$49 \$06 \$03 \$79 \$91 \$BC \$86
1850VPW ECU7 SID\$09 INF\$06 9 M4	\$48 \$6B \$16 \$49 \$06 \$04 \$7A \$91 \$BC \$85
1850VPW ECU7 SID\$09 INF\$06 9 M5	\$48 \$6B \$16 \$49 \$06 \$05 \$7B \$91 \$BC \$84
1850VPW ECU7 SID\$09 INF\$06 9 M6	\$48 \$6B \$16 \$49 \$06 \$06 \$7C \$91 \$BC \$83
1850VPW ECU7 SID\$09 INF\$06 9 M7	\$48 \$6B \$16 \$49 \$06 \$07 \$7D \$91 \$BC \$82
1850VPW ECU7 SID\$09 INF\$06 9 M8	\$48 \$6B \$16 \$49 \$06 \$08 \$7E \$55 \$AA \$81
1850VPW ECU7 SID\$09 INF\$06 9 M9	\$48 \$6B \$16 \$49 \$06 \$09 \$7F \$FF \$00 \$80

1850VPW ECU8 SID\$09 INF\$00	\$48 \$6B \$17 \$49 \$00 \$3C \$00 \$00 \$00
1850VPW ECU8 SID\$09 INF\$03 9	\$48 \$6B \$17 \$49 \$03 \$24
1850VPW ECU8 SID\$09 INF\$04 9 M1	\$48 \$6B \$17 \$49 \$04 \$01 \$31 \$38 \$35 \$38
1850VPW ECU8 SID\$09 INF\$04 9 M2	\$48 \$6B \$17 \$49 \$04 \$02 \$39 \$37 \$37 \$38
1850VPW ECU8 SID\$09 INF\$04 9 M3	\$48 \$6B \$17 \$49 \$04 \$03 \$00 \$00 \$00 \$00
1850VPW ECU8 SID\$09 INF\$04 9 M4	\$48 \$6B \$17 \$49 \$04 \$04 \$00 \$00 \$00 \$00
1850VPW ECU8 SID\$09 INF\$04 9 M5	\$48 \$6B \$17 \$49 \$04 \$05 \$32 \$38 \$35 \$38
1850VPW ECU8 SID\$09 INF\$04 9 M6	\$48 \$6B \$17 \$49 \$04 \$06 \$39 \$37 \$37 \$37
1850VPW ECU8 SID\$09 INF\$04 9 M7	\$48 \$6B \$17 \$49 \$04 \$07 \$00 \$00 \$00 \$00
1850VPW ECU8 SID\$09 INF\$04 9 M8	\$48 \$6B \$17 \$49 \$04 \$08 \$00 \$00 \$00 \$00
1850VPW ECU8 SID\$09 INF\$04 9 M9	\$48 \$6B \$17 \$49 \$04 \$09 \$33 \$38 \$35 \$38
1850VPW ECU8 SID\$09 INF\$04 9 M10	\$48 \$6B \$17 \$49 \$04 \$0A \$39 \$37 \$37 \$36
1850VPW ECU8 SID\$09 INF\$04 9 M11	\$48 \$6B \$17 \$49 \$04 \$0B \$00 \$00 \$00 \$00
1850VPW ECU8 SID\$09 INF\$04 9 M12	\$48 \$6B \$17 \$49 \$04 \$0C \$00 \$00 \$00 \$00
1850VPW ECU8 SID\$09 INF\$04 9 M13	\$48 \$6B \$17 \$49 \$04 \$0D \$34 \$38 \$35 \$38
1850VPW ECU8 SID\$09 INF\$04 9 M14	\$48 \$6B \$17 \$49 \$04 \$0E \$39 \$37 \$37 \$35
1850VPW ECU8 SID\$09 INF\$04 9 M15	\$48 \$6B \$17 \$49 \$04 \$0F \$00 \$00 \$00 \$00
1850VPW ECU8 SID\$09 INF\$04 9 M16	\$48 \$6B \$17 \$49 \$04 \$10 \$00 \$00 \$00 \$00
1850VPW ECU8 SID\$09 INF\$04 9 M17	\$48 \$6B \$17 \$49 \$04 \$11 \$35 \$38 \$35 \$38
1850VPW ECU8 SID\$09 INF\$04 9 M18	\$48 \$6B \$17 \$49 \$04 \$12 \$39 \$37 \$37 \$34
1850VPW ECU8 SID\$09 INF\$04 9 M19	\$48 \$6B \$17 \$49 \$04 \$13 \$00 \$00 \$00 \$00
1850VPW ECU8 SID\$09 INF\$04 9 M20	\$48 \$6B \$17 \$49 \$04 \$14 \$00 \$00 \$00 \$00
1850VPW ECU8 SID\$09 INF\$04 9 M21	\$48 \$6B \$17 \$49 \$04 \$15 \$36 \$38 \$35 \$38
1850VPW ECU8 SID\$09 INF\$04 9 M22	\$48 \$6B \$17 \$49 \$04 \$16 \$39 \$37 \$37 \$33
1850VPW ECU8 SID\$09 INF\$04 9 M23	\$48 \$6B \$17 \$49 \$04 \$17 \$00 \$00 \$00 \$00
1850VPW ECU8 SID\$09 INF\$04 9 M24	\$48 \$6B \$17 \$49 \$04 \$17 \$00 \$00 \$00 \$00
1850VPW ECU8 SID\$09 INF\$04 9 M25	\$48 \$6B \$17 \$49 \$04 \$19 \$37 \$38 \$35 \$38
1850VPW ECU8 SID\$09 INF\$04 9 M26	\$48 \$6B \$17 \$49 \$04 \$1A \$39 \$37 \$37 \$32
1850VPW ECU8 SID\$09 INF\$04 9 M27	\$48 \$6B \$17 \$49 \$04 \$1B \$00 \$00 \$00 \$00
1850VPW ECU8 SID\$09 INF\$04 9 M28	\$48 \$6B \$17 \$49 \$04 \$1C \$00 \$00 \$00 \$00
1850VPW ECU8 SID\$09 INF\$04 9 M29	\$48 \$6B \$17 \$49 \$04 \$1D \$38 \$38 \$35 \$38
1850VPW ECU8 SID\$09 INF\$04 9 M30	\$48 \$6B \$17 \$49 \$04 \$1E \$39 \$37 \$37 \$31
1850VPW ECU8 SID\$09 INF\$04 9 M31	\$48 \$6B \$17 \$49 \$04 \$1F \$00 \$00 \$00 \$00
1850VPW ECU8 SID\$09 INF\$04 9 M32	\$48 \$6B \$17 \$49 \$04 \$20 \$00 \$00 \$00 \$00
1850VPW ECU8 SID\$09 INF\$04 9 M33	\$48 \$6B \$17 \$49 \$04 \$21 \$39 \$38 \$35 \$38
1850VPW ECU8 SID\$09 INF\$04 9 M34	\$48 \$6B \$17 \$49 \$04 \$22 \$39 \$37 \$37 \$30
1850VPW ECU8 SID\$09 INF\$04 9 M35	\$48 \$6B \$17 \$49 \$04 \$23 \$00 \$00 \$00 \$00
1850VPW ECU8 SID\$09 INF\$04 9 M36	\$48 \$6B \$17 \$49 \$04 \$24 \$00 \$00 \$00 \$00
1850VPW ECU8 SID\$09 INF\$05 9	\$48 \$6B \$17 \$49 \$05 \$09
1850VPW ECU8 SID\$09 INF\$06 9 M1	\$48 \$6B \$17 \$49 \$06 \$01 \$87 \$91 \$BC \$88
1850VPW ECU8 SID\$09 INF\$06 9 M2	\$48 \$6B \$17 \$49 \$06 \$02 \$88 \$91 \$BC \$87
1850VPW ECU8 SID\$09 INF\$06 9 M3	\$48 \$6B \$17 \$49 \$06 \$03 \$89 \$91 \$BC \$86
1850VPW ECU8 SID\$09 INF\$06 9 M4	\$48 \$6B \$17 \$49 \$06 \$04 \$8A \$91 \$BC \$85
1850VPW ECU8 SID\$09 INF\$06 9 M5	\$48 \$6B \$17 \$49 \$06 \$05 \$8B \$91 \$BC \$84
1850VPW ECU8 SID\$09 INF\$06 9 M6	\$48 \$6B \$17 \$49 \$06 \$06 \$8C \$91 \$BC \$83
1850VPW ECU8 SID\$09 INF\$06 9 M7	\$48 \$6B \$17 \$49 \$06 \$07 \$8D \$91 \$BC \$82
1850VPW ECU8 SID\$09 INF\$06 9 M8	\$48 \$6B \$17 \$49 \$06 \$08 \$8E \$55 \$AA \$81
1850VPW ECU8 SID\$09 INF\$06 9 M9	\$48 \$6B \$17 \$49 \$06 \$09 \$8F \$FF \$00 \$80

Figure 20 - Pre-defined messages for SAE J1850 VPW

5.4.6.4 SAE J1850 VPW Message Timing

For convenience, the test cases in this document will use the text in the 'Parameter Reference' column when referring to the specific value, detailed in the 'Value' column of the table below. Unless otherwise specified, the following timing values shall be used:

Parameter Reference	Value
P2_MIN	0 ms
P2	25 ms
P2_MAX	100 ms

**Figure 21 - Pre-defined message timing
for SAE J1850 VPW**

5.4.6.5 SAE J1850 VPW Connected State

The device shall initially be in the 'Power On' state, connected to the SAE J1850 network with the appropriate termination applied (as depicted in 5.4.6.1).

5.4.6.6 SAE J1850 VPW (2 ECUs) Initialized State

The OBD network shall have determined to be SAE J1850 VPW at a baud rate of 10400 with two OBD II ECUs having been identified. The DUT may produce a periodic message transmission to keep the network alive. A successful completion of 8.5.1 shall define this state.

5.4.6.7 SAE J1850 VPW (8 ECUs) Initialized State

The OBD network shall have determined to be SAE J1850 VPW at a baud rate of 10400 with eight OBD II ECUs having been identified. The DUT may produce a periodic message transmission to keep the network alive. A successful completion of 8.5.2 shall define this state.

5.4.6.8 SAE J1850 VPW (2 ECUs) SID9 Ready State

The SID \$09 INFOTYPES shall be known for each of the two simulated OBD II ECUs on the network. The DUT may produce a periodic message transmission to keep the network alive. A successful completion of 9.5.17 shall define this state.

5.4.6.9 SAE J1850 VPW (2 ECUs) SID9 Diesel Ready State

The SID \$09 INFOTYPES shall be known for each of the two simulated OBD II ECUs on the network. The DUT may produce a periodic message transmission to keep the network alive. A successful completion of 0 shall define this state.

5.4.6.10 SAE J1850 VPW (8 ECUs) SID9 Ready State

The SID \$09 INFOTYPES shall be known for each of the eight simulated OBD II ECUs on the network. The DUT may produce a periodic message transmission to keep the network alive. A successful completion of 9.5.19 shall define this state.

5.4.7 SAE J1850 PWM

5.4.7.1 SAE J1850 PWM Electrical Connections

Figure 22 outlines the typical set-up for SAE J1850 PWM testing.

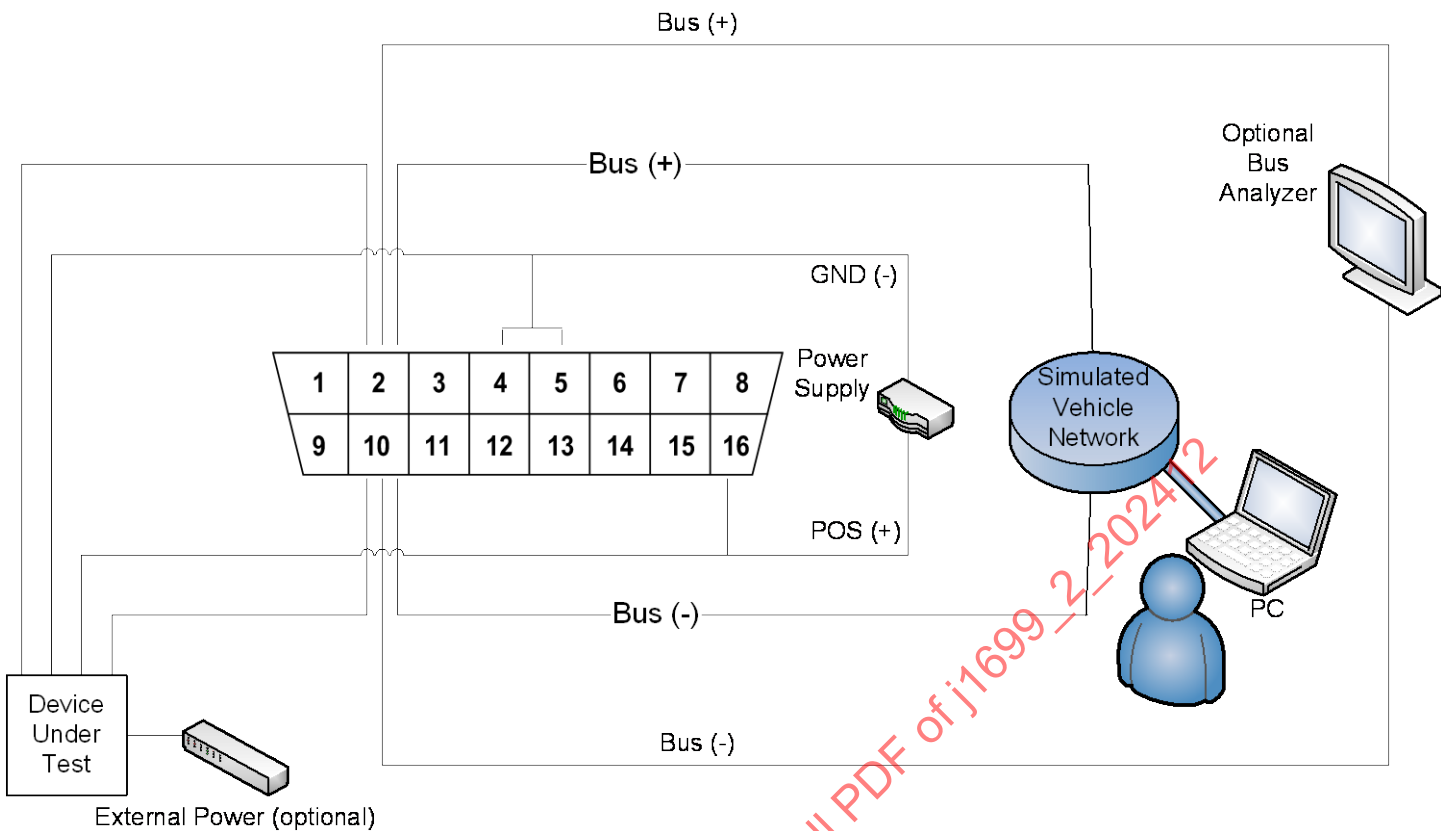


Figure 22 - Test set-up for SAE J1850 PWM testing

5.4.7.2 SAE J1850 PWM ECU Addresses

The following address bytes have been pre-defined for SAE J1850 PWM. For convenience, the test cases in this document will use the text in the 'ECU Reference' column when referring to the specific set of address bytes, detailed in the 'Address Bytes' column of the table below.

ECU Reference	Address Bytes
ECU #1	\$10
ECU #2	\$11
ECU #3	\$12
ECU #4	\$13
ECU #5	\$14
ECU #6	\$15
ECU #7	\$16
ECU #8	\$17

Figure 23 - ECU reference and associated addresses for SAE J1850 PWM

5.4.7.3 SAE J1850 PWM Messages

The following messages have been pre-defined for SAE J1850 PWM. For convenience, the test cases in this document will use the text in the 'Message Reference' column when referring to the specific set of message bytes, detailed in the 'Message Bytes' column of the table below.

Message Reference	Message Bytes
1850PWM_SID\$01_PID\$00	\$61 \$6A \$F1 \$01 \$00
1850PWM_ECU1_SID\$01_PID\$00	\$41 \$6B \$10 \$41 \$00 \$80 \$10 \$00 \$00
1850PWM_ECU2_SID\$01_PID\$00	\$41 \$6B \$11 \$41 \$00 \$80 \$10 \$00 \$00
1850PWM_ECU2_SID\$01_PID\$00	\$41 \$6B \$11 \$41 \$00 \$80 \$10 \$00 \$00
1850PWM_ECU3_SID\$01_PID\$00	\$41 \$6B \$12 \$41 \$00 \$00 \$00 \$00 \$00
1850PWM_ECU4_SID\$01_PID\$00	\$41 \$6B \$13 \$41 \$00 \$00 \$00 \$00 \$00
1850PWM_ECU5_SID\$01_PID\$00	\$41 \$6B \$14 \$41 \$00 \$00 \$00 \$00 \$00
1850PWM_ECU6_SID\$01_PID\$00	\$41 \$6B \$15 \$41 \$00 \$00 \$00 \$00 \$00
1850PWM_ECU7_SID\$01_PID\$00	\$41 \$6B \$16 \$41 \$00 \$00 \$00 \$00 \$00
1850PWM_ECU8_SID\$01_PID\$00	\$41 \$6B \$17 \$41 \$00 \$00 \$00 \$00 \$00
1850PWM_SID\$01_PID\$01	\$61 \$6A \$F1 \$01 \$01
1850PWM_SID\$01_PID\$0C	\$61 \$6A \$F1 \$01 \$0C
1850PWM_SID\$01_PID\$20	\$61 \$6A \$F1 \$01 \$20
1850PWM_SID\$01_PID\$40	\$61 \$6A \$F1 \$01 \$40
1850PWM_SID\$01_PID\$41	\$61 \$6A \$F1 \$01 \$41
1850PWM_ECU1_SID\$01_PID\$00_20	\$41 \$6B \$10 \$41 \$00 \$80 \$10 \$00 \$01
1850PWM_ECU1_SID\$01_PID\$01_SPARK	\$41 \$6B \$10 \$41 \$01 \$00 \$07 \$EF \$EF
1850PWM_ECU1_SID\$01_PID\$01_COMP	\$41 \$6B \$10 \$41 \$01 \$00 \$0F \$EB \$EB
1850PWM_ECU1_SID\$01_PID\$0C_KOEO	\$41 \$6B \$10 \$41 \$0C \$00 \$00
1850PWM_ECU1_SID\$01_PID\$20	\$41 \$6B \$10 \$41 \$20 \$00 \$00 \$00 \$01
1850PWM_ECU1_SID\$01_PID\$40	\$41 \$6B \$10 \$41 \$40 \$10 \$00 \$00 \$00
1850PWM_ECU1_SID\$01_PID\$41_SPARK	\$41 \$6B \$10 \$41 \$41 \$00 \$07 \$EF \$EF
1850PWM_ECU2_SID\$01_PID\$01_SPARK	\$41 \$6B \$11 \$41 \$01 \$81 \$44 \$00 \$00
1850PWM_ECU2_SID\$01_PID\$01_COMP	\$41 \$6B \$11 \$41 \$01 \$81 \$4C \$00 \$00
1850PWM_ECU2_SID\$01_PID\$0C_KOEO	\$41 \$6B \$11 \$41 \$0C \$00 \$00
1850PWM_SID\$02_PID\$02	\$61 \$6A \$F1 \$02 \$02 \$00
1850PWM_ECU1_SID\$02_PID\$02_NoDTC	\$41 \$6B \$10 \$42 \$02 \$00 \$00 \$00
1850PWM_ECU2_SID\$02_PID\$02_NoDTC	\$41 \$6B \$11 \$42 \$02 \$00 \$00 \$00
1850PWM_ECU1_SID\$02_PID\$02_DTC	\$41 \$6B \$10 \$42 \$02 \$00 \$01 \$07
1850PWM_SID\$03	\$61 \$6A \$F1 \$03
1850PWM_ECU1_SID\$03_NoDTC	\$41 \$6B \$10 \$43 \$00
1850PWM_ECU1_SID\$03_DTC_M1	\$41 \$6B \$10 \$43 \$01 \$07 \$01 \$10 \$01 \$15
1850PWM_ECU1_SID\$03_DTC_M2	\$41 \$6B \$10 \$43 \$01 \$24 \$00 \$00 \$00 \$00
1850PWM_ECU2_SID\$03_NoDTC	\$41 \$6B \$11 \$43 \$00
1850PWM_SID\$04	\$61 \$6A \$F1 \$04
1850PWM_ECU1_SID\$04_DONE	\$41 \$6B \$10 \$44
1850PWM_ECU1_SID\$04_NRC22	\$41 \$6B \$10 \$7F \$44 \$22
1850PWM_ECU1_SID\$04_NRC78	\$41 \$6B \$10 \$7F \$44 \$78
1850PWM_ECU2_SID\$04_DONE	\$41 \$6B \$11 \$44
1850PWM_ECU2_SID\$04_NRC22	\$41 \$6B \$11 \$7F \$44 \$22
1850PWM_SID\$05_MID\$01	\$61 \$6A \$F1 \$05 \$01 \$02
1850PWM_ECU1_SID\$05_MID\$01	\$41 \$6B \$10 \$45 \$01 \$02 \$5A
1850PWM_SID\$06_MID\$00	\$61 \$6A \$F1 \$06 \$00
1850PWM_ECU1_SID\$06_MID\$00	\$41 \$6B \$10 \$46 \$00 \$CC \$00 \$00 \$00
1850PWM_SID\$07	\$61 \$6A \$F1 \$07
1850PWM_ECU1_SID\$07_NoDTC	\$41 \$6B \$10 \$47 \$00
1850PWM_ECU1_SID\$07_DTC_M1	\$41 \$6B \$10 \$47 \$01 \$07 \$01 \$10 \$01 \$15
1850PWM_ECU1_SID\$07_DTC_M2	\$41 \$6B \$10 \$47 \$01 \$24 \$00 \$00 \$00 \$00
1850PWM_ECU2_SID\$07_NoDTC	\$41 \$6B \$11 \$47 \$00
1850PWM_SID\$08_TID\$00	\$61 \$6A \$F1 \$08
1850PWM_ECU1_SID\$08_TID\$00	\$41 \$6B \$10 \$48 \$00 \$80 \$00 \$00 \$00

1850PWM	SID\$09	INF\$00		\$61	\$6A	\$F1	\$09	\$00	
1850PWM	SID\$09	INF\$01		\$61	\$6A	\$F1	\$09	\$01	
1850PWM	SID\$09	INF\$02		\$61	\$6A	\$F1	\$09	\$02	
1850PWM	SID\$09	INF\$03		\$61	\$6A	\$F1	\$09	\$03	
1850PWM	SID\$09	INF\$04		\$61	\$6A	\$F1	\$09	\$04	
1850PWM	SID\$09	INF\$05		\$61	\$6A	\$F1	\$09	\$05	
1850PWM	SID\$09	INF\$06		\$61	\$6A	\$F1	\$09	\$06	
1850PWM	SID\$09	INF\$07		\$61	\$6A	\$F1	\$09	\$07	
1850PWM	SID\$09	INF\$08		\$61	\$6A	\$F1	\$09	\$08	
1850PWM	SID\$09	INF\$0B		\$61	\$6A	\$F1	\$09	\$0B	
1850PWM	ECU1	SID\$09	INF\$00	\$41	\$6B	\$10	\$49	\$00	\$FF \$00 \$00 \$00
1850PWM	ECU1	SID\$09	INF\$01	\$41	\$6B	\$10	\$49	\$01	\$05
1850PWM	ECU1	SID\$09	INF\$02 M1	\$41	\$6B	\$10	\$49	\$02	\$01 \$00 \$00 \$00 \$31
1850PWM	ECU1	SID\$09	INF\$02 M2	\$41	\$6B	\$10	\$49	\$02	\$02 \$47 \$59 \$44 \$45
1850PWM	ECU1	SID\$09	INF\$02 M3	\$41	\$6B	\$10	\$49	\$02	\$03 \$36 \$33 \$41 \$37
1850PWM	ECU1	SID\$09	INF\$02 M4	\$41	\$6B	\$10	\$49	\$02	\$04 \$41 \$30 \$30 \$30
1850PWM	ECU1	SID\$09	INF\$02 M5	\$41	\$6B	\$10	\$49	\$02	\$05 \$30 \$30 \$30 \$30
1850PWM	ECU1	SID\$09	INF\$03	\$41	\$6B	\$10	\$49	\$03	\$04
1850PWM	ECU1	SID\$09	INF\$03 9	\$41	\$6B	\$10	\$49	\$03	\$24
1850PWM	ECU1	SID\$09	INF\$04 M1	\$41	\$6B	\$10	\$49	\$04	\$01 \$31 \$32 \$35 \$38
1850PWM	ECU1	SID\$09	INF\$04 M2	\$41	\$6B	\$10	\$49	\$04	\$02 \$39 \$37 \$37 \$32
1850PWM	ECU1	SID\$09	INF\$04 M3	\$41	\$6B	\$10	\$49	\$04	\$03 \$00 \$00 \$00 \$00
1850PWM	ECU1	SID\$09	INF\$04 M4	\$41	\$6B	\$10	\$49	\$04	\$04 \$00 \$00 \$00 \$00
1850PWM	ECU1	SID\$09	INF\$04 9 M1	\$41	\$6B	\$10	\$49	\$04	\$01 \$31 \$31 \$35 \$38
1850PWM	ECU1	SID\$09	INF\$04 9 M2	\$41	\$6B	\$10	\$49	\$04	\$02 \$39 \$37 \$37 \$38
1850PWM	ECU1	SID\$09	INF\$04 9 M3	\$41	\$6B	\$10	\$49	\$04	\$03 \$00 \$00 \$00 \$00
1850PWM	ECU1	SID\$09	INF\$04 9 M4	\$41	\$6B	\$10	\$49	\$04	\$04 \$00 \$00 \$00 \$00
1850PWM	ECU1	SID\$09	INF\$04 9 M5	\$41	\$6B	\$10	\$49	\$04	\$05 \$32 \$31 \$35 \$38
1850PWM	ECU1	SID\$09	INF\$04 9 M6	\$41	\$6B	\$10	\$49	\$04	\$06 \$39 \$37 \$37 \$37
1850PWM	ECU1	SID\$09	INF\$04 9 M7	\$41	\$6B	\$10	\$49	\$04	\$07 \$00 \$00 \$00 \$00
1850PWM	ECU1	SID\$09	INF\$04 9 M8	\$41	\$6B	\$10	\$49	\$04	\$08 \$00 \$00 \$00 \$00
1850PWM	ECU1	SID\$09	INF\$04 9 M9	\$41	\$6B	\$10	\$49	\$04	\$09 \$33 \$31 \$35 \$38
1850PWM	ECU1	SID\$09	INF\$04 9 M10	\$41	\$6B	\$10	\$49	\$04	\$0A \$39 \$37 \$37 \$36
1850PWM	ECU1	SID\$09	INF\$04 9 M11	\$41	\$6B	\$10	\$49	\$04	\$0B \$00 \$00 \$00 \$00
1850PWM	ECU1	SID\$09	INF\$04 9 M12	\$41	\$6B	\$10	\$49	\$04	\$0C \$00 \$00 \$00 \$00
1850PWM	ECU1	SID\$09	INF\$04 9 M13	\$41	\$6B	\$10	\$49	\$04	\$0D \$34 \$31 \$35 \$38
1850PWM	ECU1	SID\$09	INF\$04 9 M14	\$41	\$6B	\$10	\$49	\$04	\$0E \$39 \$37 \$37 \$35
1850PWM	ECU1	SID\$09	INF\$04 9 M15	\$41	\$6B	\$10	\$49	\$04	\$0F \$00 \$00 \$00 \$00
1850PWM	ECU1	SID\$09	INF\$04 9 M16	\$41	\$6B	\$10	\$49	\$04	\$10 \$00 \$00 \$00 \$00
1850PWM	ECU1	SID\$09	INF\$04 9 M17	\$41	\$6B	\$10	\$49	\$04	\$11 \$35 \$31 \$35 \$38
1850PWM	ECU1	SID\$09	INF\$04 9 M18	\$41	\$6B	\$10	\$49	\$04	\$12 \$39 \$37 \$37 \$34
1850PWM	ECU1	SID\$09	INF\$04 9 M19	\$41	\$6B	\$10	\$49	\$04	\$13 \$00 \$00 \$00 \$00
1850PWM	ECU1	SID\$09	INF\$04 9 M20	\$41	\$6B	\$10	\$49	\$04	\$14 \$00 \$00 \$00 \$00
1850PWM	ECU1	SID\$09	INF\$04 9 M21	\$41	\$6B	\$10	\$49	\$04	\$15 \$36 \$31 \$35 \$38
1850PWM	ECU1	SID\$09	INF\$04 9 M22	\$41	\$6B	\$10	\$49	\$04	\$16 \$39 \$37 \$37 \$33
1850PWM	ECU1	SID\$09	INF\$04 9 M23	\$41	\$6B	\$10	\$49	\$04	\$17 \$00 \$00 \$00 \$00
1850PWM	ECU1	SID\$09	INF\$04 9 M24	\$41	\$6B	\$10	\$49	\$04	\$18 \$00 \$00 \$00 \$00
1850PWM	ECU1	SID\$09	INF\$04 9 M25	\$41	\$6B	\$10	\$49	\$04	\$19 \$37 \$31 \$35 \$38
1850PWM	ECU1	SID\$09	INF\$04 9 M26	\$41	\$6B	\$10	\$49	\$04	\$1A \$39 \$37 \$37 \$32
1850PWM	ECU1	SID\$09	INF\$04 9 M27	\$41	\$6B	\$10	\$49	\$04	\$1B \$00 \$00 \$00 \$00
1850PWM	ECU1	SID\$09	INF\$04 9 M28	\$41	\$6B	\$10	\$49	\$04	\$1C \$00 \$00 \$00 \$00
1850PWM	ECU1	SID\$09	INF\$04 9 M29	\$41	\$6B	\$10	\$49	\$04	\$1D \$38 \$31 \$35 \$38
1850PWM	ECU1	SID\$09	INF\$04 9 M30	\$41	\$6B	\$10	\$49	\$04	\$1E \$39 \$37 \$37 \$31
1850PWM	ECU1	SID\$09	INF\$04 9 M31	\$41	\$6B	\$10	\$49	\$04	\$1F \$00 \$00 \$00 \$00
1850PWM	ECU1	SID\$09	INF\$04 9 M32	\$41	\$6B	\$10	\$49	\$04	\$20 \$00 \$00 \$00 \$00
1850PWM	ECU1	SID\$09	INF\$04 9 M33	\$41	\$6B	\$10	\$49	\$04	\$21 \$39 \$31 \$35 \$38
1850PWM	ECU1	SID\$09	INF\$04 9 M34	\$41	\$6B	\$10	\$49	\$04	\$22 \$39 \$37 \$37 \$30
1850PWM	ECU1	SID\$09	INF\$04 9 M35	\$41	\$6B	\$10	\$49	\$04	\$23 \$00 \$00 \$00 \$00

1850PWM	ECU1	SID\$09	INF\$04	9	M36	\$41	\$6B	\$10	\$49	\$04	\$24	\$00	\$00	\$00	\$00
1850PWM	ECU1	SID\$09	INF\$05			\$41	\$6B	\$10	\$49	\$05	\$01				
1850PWM	ECU1	SID\$09	INF\$05	9		\$41	\$6B	\$10	\$49	\$05	\$09				
1850PWM	ECU1	SID\$09	INF\$06			\$41	\$6B	\$10	\$49	\$06	\$01	\$17	\$91	\$BC	\$88
1850PWM	ECU1	SID\$09	INF\$06	9	M1	\$41	\$6B	\$10	\$49	\$06	\$01	\$17	\$91	\$BC	\$88
1850PWM	ECU1	SID\$09	INF\$06	9	M2	\$41	\$6B	\$10	\$49	\$06	\$02	\$18	\$91	\$BC	\$87
1850PWM	ECU1	SID\$09	INF\$06	9	M3	\$41	\$6B	\$10	\$49	\$06	\$03	\$19	\$91	\$BC	\$86
1850PWM	ECU1	SID\$09	INF\$06	9	M4	\$41	\$6B	\$10	\$49	\$06	\$04	\$1A	\$91	\$BC	\$85
1850PWM	ECU1	SID\$09	INF\$06	9	M5	\$41	\$6B	\$10	\$49	\$06	\$05	\$1B	\$91	\$BC	\$84
1850PWM	ECU1	SID\$09	INF\$06	9	M6	\$41	\$6B	\$10	\$49	\$06	\$06	\$1C	\$91	\$BC	\$83
1850PWM	ECU1	SID\$09	INF\$06	9	M7	\$41	\$6B	\$10	\$49	\$06	\$07	\$1D	\$91	\$BC	\$82
1850PWM	ECU1	SID\$09	INF\$06	9	M8	\$41	\$6B	\$10	\$49	\$06	\$08	\$1E	\$55	\$AA	\$81
1850PWM	ECU1	SID\$09	INF\$06	9	M9	\$41	\$6B	\$10	\$49	\$06	\$09	\$1F	\$FF	\$00	\$80
1850PWM	ECU1	SID\$09	INF\$07	832		\$41	\$6B	\$10	\$49	\$07	\$08				
1850PWM	ECU1	SID\$09	INF\$07	840		\$41	\$6B	\$10	\$49	\$07	\$0A				
1850PWM	ECU1	SID\$09	INF\$08	32	M1	\$41	\$6B	\$10	\$49	\$08	\$01	\$00	\$64	\$00	\$69
1850PWM	ECU1	SID\$09	INF\$08	32	M2	\$41	\$6B	\$10	\$49	\$08	\$02	\$00	\$0A	\$00	\$0F
1850PWM	ECU1	SID\$09	INF\$08	32	M3	\$41	\$6B	\$10	\$49	\$08	\$03	\$00	\$00	\$00	\$00
1850PWM	ECU1	SID\$09	INF\$08	32	M4	\$41	\$6B	\$10	\$49	\$08	\$04	\$00	\$1E	\$00	\$23
1850PWM	ECU1	SID\$09	INF\$08	32	M5	\$41	\$6B	\$10	\$49	\$08	\$05	\$00	\$00	\$00	\$00
1850PWM	ECU1	SID\$09	INF\$08	32	M6	\$41	\$6B	\$10	\$49	\$08	\$06	\$00	\$32	\$00	\$37
1850PWM	ECU1	SID\$09	INF\$08	32	M7	\$41	\$6B	\$10	\$49	\$08	\$07	\$00	\$3C	\$00	\$41
1850PWM	ECU1	SID\$09	INF\$08	32	M8	\$41	\$6B	\$10	\$49	\$08	\$08	\$00	\$46	\$00	\$4B
1850PWM	ECU1	SID\$09	INF\$08	40	M1	\$41	\$6B	\$10	\$49	\$08	\$01	\$00	\$64	\$00	\$69
1850PWM	ECU1	SID\$09	INF\$08	40	M2	\$41	\$6B	\$10	\$49	\$08	\$02	\$00	\$0A	\$00	\$0F
1850PWM	ECU1	SID\$09	INF\$08	40	M3	\$41	\$6B	\$10	\$49	\$08	\$03	\$00	\$00	\$00	\$00
1850PWM	ECU1	SID\$09	INF\$08	40	M4	\$41	\$6B	\$10	\$49	\$08	\$04	\$00	\$1E	\$00	\$23
1850PWM	ECU1	SID\$09	INF\$08	40	M5	\$41	\$6B	\$10	\$49	\$08	\$05	\$00	\$00	\$00	\$00
1850PWM	ECU1	SID\$09	INF\$08	40	M6	\$41	\$6B	\$10	\$49	\$08	\$06	\$00	\$32	\$00	\$37
1850PWM	ECU1	SID\$09	INF\$08	40	M7	\$41	\$6B	\$10	\$49	\$08	\$07	\$00	\$3C	\$00	\$41
1850PWM	ECU1	SID\$09	INF\$08	40	M8	\$41	\$6B	\$10	\$49	\$08	\$08	\$00	\$46	\$00	\$4B
1850PWM	ECU1	SID\$09	INF\$08	40	M9	\$41	\$6B	\$10	\$49	\$08	\$09	\$00	\$5A	\$00	\$5F
1850PWM	ECU1	SID\$09	INF\$08	40	M10	\$41	\$6B	\$10	\$49	\$08	\$0A	\$00	\$00	\$00	\$00
1850PWM	ECU1	SID\$09	NRC78			\$41	\$6B	\$10	\$7F	\$49	\$78				
1850PWM	ECU2	SID\$09	INF\$00			\$41	\$6B	\$11	\$49	\$00	\$3F	\$00	\$00	\$00	\$00
1850PWM	ECU2	SID\$09	INF\$03			\$41	\$6B	\$11	\$49	\$03	\$04				
1850PWM	ECU2	SID\$09	INF\$03	9		\$41	\$6B	\$11	\$49	\$03	\$24				
1850PWM	ECU2	SID\$09	INF\$04	M1		\$41	\$6B	\$11	\$49	\$04	\$01	\$32	\$34	\$32	\$32
1850PWM	ECU2	SID\$09	INF\$04	M2		\$41	\$6B	\$11	\$49	\$04	\$02	\$31	\$34	\$31	\$39
1850PWM	ECU2	SID\$09	INF\$04	M3		\$41	\$6B	\$11	\$49	\$04	\$03	\$00	\$00	\$00	\$00
1850PWM	ECU2	SID\$09	INF\$04	M4		\$41	\$6B	\$11	\$49	\$04	\$04	\$00	\$00	\$00	\$00
1850PWM	ECU2	SID\$09	INF\$04	9	M1	\$41	\$6B	\$11	\$49	\$04	\$01	\$31	\$32	\$35	\$38
1850PWM	ECU2	SID\$09	INF\$04	9	M2	\$41	\$6B	\$11	\$49	\$04	\$02	\$39	\$37	\$37	\$38
1850PWM	ECU2	SID\$09	INF\$04	9	M3	\$41	\$6B	\$11	\$49	\$04	\$03	\$00	\$00	\$00	\$00
1850PWM	ECU2	SID\$09	INF\$04	9	M4	\$41	\$6B	\$11	\$49	\$04	\$04	\$00	\$00	\$00	\$00
1850PWM	ECU2	SID\$09	INF\$04	9	M5	\$41	\$6B	\$11	\$49	\$04	\$05	\$32	\$32	\$35	\$38
1850PWM	ECU2	SID\$09	INF\$04	9	M6	\$41	\$6B	\$11	\$49	\$04	\$06	\$39	\$37	\$37	\$37
1850PWM	ECU2	SID\$09	INF\$04	9	M7	\$41	\$6B	\$11	\$49	\$04	\$07	\$00	\$00	\$00	\$00
1850PWM	ECU2	SID\$09	INF\$04	9	M8	\$41	\$6B	\$11	\$49	\$04	\$08	\$00	\$00	\$00	\$00
1850PWM	ECU2	SID\$09	INF\$04	9	M9	\$41	\$6B	\$11	\$49	\$04	\$09	\$33	\$32	\$35	\$38
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1850PWM	ECU2	SID\$09	INF\$04	9	M11	\$41	\$6B	\$11	\$49	\$04	\$0B	\$00	\$00	\$00	\$00
1850PWM	ECU2	SID\$09	INF\$04	9	M12	\$41	\$6B	\$11	\$49	\$04	\$0C	\$00	\$00	\$00	\$00
1850PWM	ECU2	SID\$09	INF\$04	9	M13	\$41	\$6B	\$11	\$49	\$04	\$0D	\$34	\$32	\$35	\$38
1850PWM	ECU2	SID\$09	INF\$04	9	M14	\$41	\$6B	\$11	\$49	\$04	\$0E	\$39	\$37	\$37	\$35
1850PWM	ECU2	SID\$09	INF\$04	9	M15	\$41	\$6B	\$11	\$49	\$04	\$0F	\$00	\$00	\$00	\$00
1850PWM	ECU2	SID\$09	INF\$04	9	M16	\$41	\$6B	\$11	\$49	\$04	\$10	\$00	\$00	\$00	\$00
1850PWM	ECU2	SID\$09	INF\$04	9	M17	\$41	\$6B	\$11	\$49	\$04	\$11	\$35	\$32	\$35	\$38

1850PWM	ECU2	SID\$09	INF\$04	9	M18	\$41	\$6B	\$11	\$49	\$04	\$12	\$39	\$37	\$37	\$34
1850PWM	ECU2	SID\$09	INF\$04	9	M19	\$41	\$6B	\$11	\$49	\$04	\$13	\$00	\$00	\$00	\$00
1850PWM	ECU2	SID\$09	INF\$04	9	M20	\$41	\$6B	\$11	\$49	\$04	\$14	\$00	\$00	\$00	\$00
1850PWM	ECU2	SID\$09	INF\$04	9	M21	\$41	\$6B	\$11	\$49	\$04	\$15	\$36	\$32	\$35	\$38
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1850PWM	ECU2	SID\$09	INF\$04	9	M23	\$41	\$6B	\$11	\$49	\$04	\$17	\$00	\$00	\$00	\$00
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1850PWM	ECU2	SID\$09	INF\$04	9	M25	\$41	\$6B	\$11	\$49	\$04	\$19	\$37	\$32	\$35	\$38
1850PWM	ECU2	SID\$09	INF\$04	9	M26	\$41	\$6B	\$11	\$49	\$04	\$1A	\$39	\$37	\$37	\$32
1850PWM	ECU2	SID\$09	INF\$04	9	M27	\$41	\$6B	\$11	\$49	\$04	\$1B	\$00	\$00	\$00	\$00
1850PWM	ECU2	SID\$09	INF\$04	9	M28	\$41	\$6B	\$11	\$49	\$04	\$1C	\$00	\$00	\$00	\$00
1850PWM	ECU2	SID\$09	INF\$04	9	M29	\$41	\$6B	\$11	\$49	\$04	\$1D	\$38	\$32	\$35	\$38
1850PWM	ECU2	SID\$09	INF\$04	9	M30	\$41	\$6B	\$11	\$49	\$04	\$1E	\$39	\$37	\$37	\$31
1850PWM	ECU2	SID\$09	INF\$04	9	M31	\$41	\$6B	\$11	\$49	\$04	\$1F	\$00	\$00	\$00	\$00
1850PWM	ECU2	SID\$09	INF\$04	9	M32	\$41	\$6B	\$11	\$49	\$04	\$20	\$00	\$00	\$00	\$00
1850PWM	ECU2	SID\$09	INF\$04	9	M33	\$41	\$6B	\$11	\$49	\$04	\$21	\$39	\$32	\$35	\$38
1850PWM	ECU2	SID\$09	INF\$04	9	M34	\$41	\$6B	\$11	\$49	\$04	\$22	\$39	\$37	\$37	\$30
1850PWM	ECU2	SID\$09	INF\$04	9	M35	\$41	\$6B	\$11	\$49	\$04	\$23	\$00	\$00	\$00	\$00
1850PWM	ECU2	SID\$09	INF\$04	9	M36	\$41	\$6B	\$11	\$49	\$04	\$24	\$00	\$00	\$00	\$00
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1850PWM	ECU2	SID\$09	INF\$05	9		\$41	\$6B	\$11	\$49	\$05	\$09				
1850PWM	ECU2	SID\$09	INF\$06			\$41	\$6B	\$11	\$49	\$06	\$01	\$27	\$91	\$BC	\$88
1850PWM	ECU2	SID\$09	INF\$06	9	M1	\$41	\$6B	\$11	\$49	\$06	\$01	\$27	\$91	\$BC	\$88
1850PWM	ECU2	SID\$09	INF\$06	9	M2	\$41	\$6B	\$11	\$49	\$06	\$02	\$28	\$91	\$BC	\$87
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1850PWM	ECU2	SID\$09	INF\$06	9	M5	\$41	\$6B	\$11	\$49	\$06	\$05	\$2B	\$91	\$BC	\$84
1850PWM	ECU2	SID\$09	INF\$06	9	M6	\$41	\$6B	\$11	\$49	\$06	\$06	\$2C	\$91	\$BC	\$83
1850PWM	ECU2	SID\$09	INF\$06	9	M7	\$41	\$6B	\$11	\$49	\$06	\$07	\$2D	\$91	\$BC	\$82
1850PWM	ECU2	SID\$09	INF\$06	9	M8	\$41	\$6B	\$11	\$49	\$06	\$08	\$2E	\$55	\$AA	\$81
1850PWM	ECU2	SID\$09	INF\$06	9	M9	\$41	\$6B	\$11	\$49	\$06	\$09	\$2F	\$FF	\$00	\$80
1850PWM	ECU2	SID\$09	INF\$07		832	\$41	\$6B	\$11	\$49	\$07	\$08				
1850PWM	ECU2	SID\$09	INF\$07		840	\$41	\$6B	\$11	\$49	\$07	\$0A				
1850PWM	ECU2	SID\$09	INF\$07		B32	\$41	\$6B	\$11	\$49	\$07	\$08				
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1850PWM	ECU2	SID\$09	INF\$08	32	M1	\$41	\$6B	\$11	\$49	\$08	\$01	\$00	\$64	\$00	\$69
1850PWM	ECU2	SID\$09	INF\$08	32	M2	\$41	\$6B	\$11	\$49	\$08	\$02	\$00	\$00	\$00	\$00
1850PWM	ECU2	SID\$09	INF\$08	32	M3	\$41	\$6B	\$11	\$49	\$08	\$03	\$00	\$14	\$00	\$19
1850PWM	ECU2	SID\$09	INF\$08	32	M4	\$41	\$6B	\$11	\$49	\$08	\$04	\$00	\$00	\$00	\$00
1850PWM	ECU2	SID\$09	INF\$08	32	M5	\$41	\$6B	\$11	\$49	\$08	\$05	\$00	\$28	\$00	\$2D
1850PWM	ECU2	SID\$09	INF\$08	32	M6	\$41	\$6B	\$11	\$49	\$08	\$06	\$00	\$00	\$00	\$00
1850PWM	ECU2	SID\$09	INF\$08	32	M7	\$41	\$6B	\$11	\$49	\$08	\$07	\$00	\$00	\$00	\$00
1850PWM	ECU2	SID\$09	INF\$08	32	M8	\$41	\$6B	\$11	\$49	\$08	\$08	\$00	\$00	\$00	\$00
1850PWM	ECU2	SID\$09	INF\$08	40	M1	\$41	\$6B	\$11	\$49	\$08	\$01	\$00	\$64	\$00	\$69
1850PWM	ECU2	SID\$09	INF\$08	40	M2	\$41	\$6B	\$11	\$49	\$08	\$02	\$00	\$00	\$00	\$00
1850PWM	ECU2	SID\$09	INF\$08	40	M3	\$41	\$6B	\$11	\$49	\$08	\$03	\$00	\$14	\$00	\$19
1850PWM	ECU2	SID\$09	INF\$08	40	M4	\$41	\$6B	\$11	\$49	\$08	\$04	\$00	\$00	\$00	\$00
1850PWM	ECU2	SID\$09	INF\$08	40	M5	\$41	\$6B	\$11	\$49	\$08	\$05	\$00	\$28	\$00	\$2D
1850PWM	ECU2	SID\$09	INF\$08	40	M6	\$41	\$6B	\$11	\$49	\$08	\$06	\$00	\$00	\$00	\$00
1850PWM	ECU2	SID\$09	INF\$08	40	M7	\$41	\$6B	\$11	\$49	\$08	\$07	\$00	\$00	\$00	\$00
1850PWM	ECU2	SID\$09	INF\$08	40	M8	\$41	\$6B	\$11	\$49	\$08	\$08	\$00	\$00	\$00	\$00
1850PWM	ECU2	SID\$09	INF\$08	40	M9	\$41	\$6B	\$11	\$49	\$08	\$09	\$00	\$00	\$00	\$00
1850PWM	ECU2	SID\$09	INF\$08	40	M10	\$41	\$6B	\$11	\$49	\$08	\$0A	\$00	\$5A	\$00	\$5F
1850PWM	ECU3	SID\$09	INF\$00			\$41	\$6B	\$12	\$49	\$00	\$3C	\$00	\$00	\$00	\$00
1850PWM	ECU3	SID\$09	INF\$03	9		\$41	\$6B	\$12	\$49	\$03	\$24				
1850PWM	ECU3	SID\$09	INF\$04	9	M1	\$41	\$6B	\$12	\$49	\$04	\$01	\$31	\$33	\$35	\$38
1850PWM	ECU3	SID\$09	INF\$04	9	M2	\$41	\$6B	\$12	\$49	\$04	\$02	\$39	\$37	\$37	\$38
1850PWM	ECU3	SID\$09	INF\$04	9	M3	\$41	\$6B	\$12	\$49	\$04	\$03	\$00	\$00	\$00	\$00

1850PWM	ECU3	SID\$09	INF\$04	9	M4	\$41	\$6B	\$12	\$49	\$04	\$04	\$00	\$00	\$00	\$00
1850PWM	ECU3	SID\$09	INF\$04	9	M5	\$41	\$6B	\$12	\$49	\$04	\$05	\$32	\$33	\$35	\$38
1850PWM	ECU3	SID\$09	INF\$04	9	M6	\$41	\$6B	\$12	\$49	\$04	\$06	\$39	\$37	\$37	\$37
1850PWM	ECU3	SID\$09	INF\$04	9	M7	\$41	\$6B	\$12	\$49	\$04	\$07	\$00	\$00	\$00	\$00
1850PWM	ECU3	SID\$09	INF\$04	9	M8	\$41	\$6B	\$12	\$49	\$04	\$08	\$00	\$00	\$00	\$00
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1850PWM	ECU3	SID\$09	INF\$04	9	M11	\$41	\$6B	\$12	\$49	\$04	\$0B	\$00	\$00	\$00	\$00
1850PWM	ECU3	SID\$09	INF\$04	9	M12	\$41	\$6B	\$12	\$49	\$04	\$0C	\$00	\$00	\$00	\$00
1850PWM	ECU3	SID\$09	INF\$04	9	M13	\$41	\$6B	\$12	\$49	\$04	\$0D	\$34	\$33	\$35	\$38
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1850PWM	ECU3	SID\$09	INF\$04	9	M15	\$41	\$6B	\$12	\$49	\$04	\$0F	\$00	\$00	\$00	\$00
1850PWM	ECU3	SID\$09	INF\$04	9	M16	\$41	\$6B	\$12	\$49	\$04	\$10	\$00	\$00	\$00	\$00
1850PWM	ECU3	SID\$09	INF\$04	9	M17	\$41	\$6B	\$12	\$49	\$04	\$11	\$35	\$33	\$35	\$38
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1850PWM	ECU3	SID\$09	INF\$04	9	M21	\$41	\$6B	\$12	\$49	\$04	\$15	\$36	\$33	\$35	\$38
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1850PWM	ECU3	SID\$09	INF\$04	9	M23	\$41	\$6B	\$12	\$49	\$04	\$17	\$00	\$00	\$00	\$00
1850PWM	ECU3	SID\$09	INF\$04	9	M24	\$41	\$6B	\$12	\$49	\$04	\$18	\$00	\$00	\$00	\$00
1850PWM	ECU3	SID\$09	INF\$04	9	M25	\$41	\$6B	\$12	\$49	\$04	\$19	\$37	\$33	\$35	\$38
1850PWM	ECU3	SID\$09	INF\$04	9	M26	\$41	\$6B	\$12	\$49	\$04	\$1A	\$39	\$37	\$37	\$32
1850PWM	ECU3	SID\$09	INF\$04	9	M27	\$41	\$6B	\$12	\$49	\$04	\$1B	\$00	\$00	\$00	\$00
1850PWM	ECU3	SID\$09	INF\$04	9	M28	\$41	\$6B	\$12	\$49	\$04	\$1C	\$00	\$00	\$00	\$00
1850PWM	ECU3	SID\$09	INF\$04	9	M29	\$41	\$6B	\$12	\$49	\$04	\$1D	\$38	\$33	\$35	\$38
1850PWM	ECU3	SID\$09	INF\$04	9	M30	\$41	\$6B	\$12	\$49	\$04	\$1E	\$39	\$37	\$37	\$31
1850PWM	ECU3	SID\$09	INF\$04	9	M31	\$41	\$6B	\$12	\$49	\$04	\$1F	\$00	\$00	\$00	\$00
1850PWM	ECU3	SID\$09	INF\$04	9	M32	\$41	\$6B	\$12	\$49	\$04	\$20	\$00	\$00	\$00	\$00
1850PWM	ECU3	SID\$09	INF\$04	9	M33	\$41	\$6B	\$12	\$49	\$04	\$21	\$39	\$33	\$35	\$38
1850PWM	ECU3	SID\$09	INF\$04	9	M34	\$41	\$6B	\$12	\$49	\$04	\$22	\$39	\$37	\$37	\$30
1850PWM	ECU3	SID\$09	INF\$04	9	M35	\$41	\$6B	\$12	\$49	\$04	\$23	\$00	\$00	\$00	\$00
1850PWM	ECU3	SID\$09	INF\$04	9	M36	\$41	\$6B	\$12	\$49	\$04	\$24	\$00	\$00	\$00	\$00
1850PWM	ECU3	SID\$09	INF\$05	9		\$41	\$6B	\$12	\$49	\$05	\$09				
1850PWM	ECU3	SID\$09	INF\$06	9	M1	\$41	\$6B	\$12	\$49	\$06	\$01	\$37	\$91	\$BC	\$88
1850PWM	ECU3	SID\$09	INF\$06	9	M2	\$41	\$6B	\$12	\$49	\$06	\$02	\$38	\$91	\$BC	\$87
1850PWM	ECU3	SID\$09	INF\$06	9	M3	\$41	\$6B	\$12	\$49	\$06	\$03	\$39	\$91	\$BC	\$86
1850PWM	ECU3	SID\$09	INF\$06	9	M4	\$41	\$6B	\$12	\$49	\$06	\$04	\$3A	\$91	\$BC	\$85
1850PWM	ECU3	SID\$09	INF\$06	9	M5	\$41	\$6B	\$12	\$49	\$06	\$05	\$3B	\$91	\$BC	\$84
1850PWM	ECU3	SID\$09	INF\$06	9	M6	\$41	\$6B	\$12	\$49	\$06	\$06	\$3C	\$91	\$BC	\$83
1850PWM	ECU3	SID\$09	INF\$06	9	M7	\$41	\$6B	\$12	\$49	\$06	\$07	\$3D	\$91	\$BC	\$82
1850PWM	ECU3	SID\$09	INF\$06	9	M8	\$41	\$6B	\$12	\$49	\$06	\$08	\$3E	\$55	\$AA	\$81
1850PWM	ECU3	SID\$09	INF\$06	9	M9	\$41	\$6B	\$12	\$49	\$06	\$09	\$3F	\$FF	\$00	\$80
1850PWM	ECU4	SID\$09	INF\$00			\$41	\$6B	\$13	\$49	\$00	\$3C	\$00	\$00	\$00	
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1850PWM	ECU4	SID\$09	INF\$04	9	M1	\$41	\$6B	\$13	\$49	\$04	\$01	\$31	\$34	\$35	\$38
1850PWM	ECU4	SID\$09	INF\$04	9	M2	\$41	\$6B	\$13	\$49	\$04	\$02	\$39	\$37	\$37	\$38
1850PWM	ECU4	SID\$09	INF\$04	9	M3	\$41	\$6B	\$13	\$49	\$04	\$03	\$00	\$00	\$00	\$00
1850PWM	ECU4	SID\$09	INF\$04	9	M4	\$41	\$6B	\$13	\$49	\$04	\$04	\$00	\$00	\$00	\$00
1850PWM	ECU4	SID\$09	INF\$04	9	M5	\$41	\$6B	\$13	\$49	\$04	\$05	\$32	\$34	\$35	\$38
1850PWM	ECU4	SID\$09	INF\$04	9	M6	\$41	\$6B	\$13	\$49	\$04	\$06	\$39	\$37	\$37	\$37
1850PWM	ECU4	SID\$09	INF\$04	9	M7	\$41	\$6B	\$13	\$49	\$04	\$07	\$00	\$00	\$00	\$00
1850PWM	ECU4	SID\$09	INF\$04	9	M8	\$41	\$6B	\$13	\$49	\$04	\$08	\$00	\$00	\$00	\$00
1850PWM	ECU4	SID\$09	INF\$04	9	M9	\$41	\$6B	\$13	\$49	\$04	\$09	\$33	\$34	\$35	\$38
1850PWM	ECU4	SID\$09	INF\$04	9	M10	\$41	\$6B	\$13	\$49	\$04	\$0A	\$39	\$37	\$37	\$36
1850PWM	ECU4	SID\$09	INF\$04	9	M11	\$41	\$6B	\$13	\$49	\$04	\$0B	\$00	\$00	\$00	\$00
1850PWM	ECU4	SID\$09	INF\$04	9	M12	\$41	\$6B	\$13	\$49	\$04	\$0C	\$00	\$00	\$00	\$00
1850PWM	ECU4	SID\$09	INF\$04	9	M13	\$41	\$6B	\$13	\$49	\$04	\$0D	\$34	\$34	\$35	\$38

1850PWM	ECU4	SID\$09	INF\$04	9	M14	\$41	\$6B	\$13	\$49	\$04	\$0E	\$39	\$37	\$37	\$35
1850PWM	ECU4	SID\$09	INF\$04	9	M15	\$41	\$6B	\$13	\$49	\$04	\$0F	\$00	\$00	\$00	\$00
1850PWM	ECU4	SID\$09	INF\$04	9	M16	\$41	\$6B	\$13	\$49	\$04	\$10	\$00	\$00	\$00	\$00
1850PWM	ECU4	SID\$09	INF\$04	9	M17	\$41	\$6B	\$13	\$49	\$04	\$11	\$35	\$34	\$35	\$38
1850PWM	ECU4	SID\$09	INF\$04	9	M18	\$41	\$6B	\$13	\$49	\$04	\$12	\$39	\$37	\$37	\$34
1850PWM	ECU4	SID\$09	INF\$04	9	M19	\$41	\$6B	\$13	\$49	\$04	\$13	\$00	\$00	\$00	\$00
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1850PWM	ECU4	SID\$09	INF\$04	9	M21	\$41	\$6B	\$13	\$49	\$04	\$15	\$36	\$34	\$35	\$38
1850PWM	ECU4	SID\$09	INF\$04	9	M22	\$41	\$6B	\$13	\$49	\$04	\$16	\$39	\$37	\$37	\$33
1850PWM	ECU4	SID\$09	INF\$04	9	M23	\$41	\$6B	\$13	\$49	\$04	\$17	\$00	\$00	\$00	\$00
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1850PWM	ECU4	SID\$09	INF\$04	9	M25	\$41	\$6B	\$13	\$49	\$04	\$19	\$37	\$34	\$35	\$38
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1850PWM	ECU4	SID\$09	INF\$04	9	M27	\$41	\$6B	\$13	\$49	\$04	\$1B	\$00	\$00	\$00	\$00
1850PWM	ECU4	SID\$09	INF\$04	9	M28	\$41	\$6B	\$13	\$49	\$04	\$1C	\$00	\$00	\$00	\$00
1850PWM	ECU4	SID\$09	INF\$04	9	M29	\$41	\$6B	\$13	\$49	\$04	\$1D	\$38	\$34	\$35	\$38
1850PWM	ECU4	SID\$09	INF\$04	9	M30	\$41	\$6B	\$13	\$49	\$04	\$1E	\$39	\$37	\$37	\$31
1850PWM	ECU4	SID\$09	INF\$04	9	M31	\$41	\$6B	\$13	\$49	\$04	\$1F	\$00	\$00	\$00	\$00
1850PWM	ECU4	SID\$09	INF\$04	9	M32	\$41	\$6B	\$13	\$49	\$04	\$20	\$00	\$00	\$00	\$00
1850PWM	ECU4	SID\$09	INF\$04	9	M33	\$41	\$6B	\$13	\$49	\$04	\$21	\$39	\$34	\$35	\$38
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1850PWM	ECU4	SID\$09	INF\$04	9	M35	\$41	\$6B	\$13	\$49	\$04	\$23	\$00	\$00	\$00	\$00
1850PWM	ECU4	SID\$09	INF\$04	9	M36	\$41	\$6B	\$13	\$49	\$04	\$24	\$00	\$00	\$00	\$00
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1850PWM	ECU4	SID\$09	INF\$06	9	M2	\$41	\$6B	\$13	\$49	\$06	\$02	\$48	\$91	\$BC	\$87
1850PWM	ECU4	SID\$09	INF\$06	9	M3	\$41	\$6B	\$13	\$49	\$06	\$03	\$49	\$91	\$BC	\$86
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1850PWM	ECU4	SID\$09	INF\$06	9	M6	\$41	\$6B	\$13	\$49	\$06	\$06	\$4C	\$91	\$BC	\$83
1850PWM	ECU4	SID\$09	INF\$06	9	M7	\$41	\$6B	\$13	\$49	\$06	\$07	\$4D	\$91	\$BC	\$82
1850PWM	ECU4	SID\$09	INF\$06	9	M8	\$41	\$6B	\$13	\$49	\$06	\$08	\$4E	\$55	\$AA	\$81
1850PWM	ECU4	SID\$09	INF\$06	9	M9	\$41	\$6B	\$13	\$49	\$06	\$09	\$4F	\$FF	\$00	\$80
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1850PWM	ECU5	SID\$09	INF\$04	9	M15	\$41	\$6B	\$14	\$49	\$04	\$0F	\$00	\$00	\$00	\$00
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1850PWM	ECU5	SID\$09	INF\$04	9	M17	\$41	\$6B	\$14	\$49	\$04	\$11	\$35	\$35	\$35	\$38
1850PWM	ECU5	SID\$09	INF\$04	9	M18	\$41	\$6B	\$14	\$49	\$04	\$12	\$39	\$37	\$37	\$34
1850PWM	ECU5	SID\$09	INF\$04	9	M19	\$41	\$6B	\$14	\$49	\$04	\$13	\$00	\$00	\$00	\$00
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1850PWM	ECU5	SID\$09	INF\$04	9	M22	\$41	\$6B	\$14	\$49	\$04	\$16	\$39	\$37	\$37	\$33
1850PWM	ECU5	SID\$09	INF\$04	9	M23	\$41	\$6B	\$14	\$49	\$04	\$17	\$00	\$00	\$00	\$00

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1850PWM	ECU5	SID\$09	INF\$04	9	M29	\$41	\$6B	\$14	\$49	\$04	\$1D	\$38	\$35	\$35	\$38
1850PWM	ECU5	SID\$09	INF\$04	9	M30	\$41	\$6B	\$14	\$49	\$04	\$1E	\$39	\$37	\$37	\$31
1850PWM	ECU5	SID\$09	INF\$04	9	M31	\$41	\$6B	\$14	\$49	\$04	\$1F	\$00	\$00	\$00	\$00
1850PWM	ECU5	SID\$09	INF\$04	9	M32	\$41	\$6B	\$14	\$49	\$04	\$20	\$00	\$00	\$00	\$00
1850PWM	ECU5	SID\$09	INF\$04	9	M33	\$41	\$6B	\$14	\$49	\$04	\$21	\$39	\$35	\$35	\$38
1850PWM	ECU5	SID\$09	INF\$04	9	M34	\$41	\$6B	\$14	\$49	\$04	\$22	\$39	\$37	\$37	\$30
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1850PWM	ECU5	SID\$09	INF\$04	9	M36	\$41	\$6B	\$14	\$49	\$04	\$24	\$00	\$00	\$00	\$00
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1850PWM	ECU5	SID\$09	INF\$06	9	M1	\$41	\$6B	\$14	\$49	\$06	\$01	\$57	\$91	\$BC	\$88
1850PWM	ECU5	SID\$09	INF\$06	9	M2	\$41	\$6B	\$14	\$49	\$06	\$02	\$58	\$91	\$BC	\$87
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1850PWM	ECU5	SID\$09	INF\$06	9	M7	\$41	\$6B	\$14	\$49	\$06	\$07	\$5D	\$91	\$BC	\$82
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1850PWM	ECU6	SID\$09	INF\$03	9		\$41	\$6B	\$15	\$49	\$03	\$24				
1850PWM	ECU6	SID\$09	INF\$04	9	M1	\$41	\$6B	\$15	\$49	\$04	\$01	\$31	\$36	\$35	\$38
1850PWM	ECU6	SID\$09	INF\$04	9	M2	\$41	\$6B	\$15	\$49	\$04	\$02	\$39	\$37	\$37	\$38
1850PWM	ECU6	SID\$09	INF\$04	9	M3	\$41	\$6B	\$15	\$49	\$04	\$03	\$00	\$00	\$00	\$00
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1850PWM	ECU6	SID\$09	INF\$04	9	M17	\$41	\$6B	\$15	\$49	\$04	\$11	\$35	\$36	\$35	\$38
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1850PWM	ECU6	SID\$09	INF\$04	9	M29	\$41	\$6B	\$15	\$49	\$04	\$1D	\$38	\$36	\$35	\$38
1850PWM	ECU6	SID\$09	INF\$04	9	M30	\$41	\$6B	\$15	\$49	\$04	\$1E	\$39	\$37	\$37	\$31
1850PWM	ECU6	SID\$09	INF\$04	9	M31	\$41	\$6B	\$15	\$49	\$04	\$1F	\$00	\$00	\$00	\$00
1850PWM	ECU6	SID\$09	INF\$04	9	M32	\$41	\$6B	\$15	\$49	\$04	\$20	\$00	\$00	\$00	\$00
1850PWM	ECU6	SID\$09	INF\$04	9	M33	\$41	\$6B	\$15	\$49	\$04	\$21	\$39	\$36	\$35	\$38

1850PWM	ECU6	SID\$09	INF\$04	9	M34	\$41	\$6B	\$15	\$49	\$04	\$22	\$39	\$37	\$37	\$30
1850PWM	ECU6	SID\$09	INF\$04	9	M35	\$41	\$6B	\$15	\$49	\$04	\$23	\$00	\$00	\$00	\$00
1850PWM	ECU6	SID\$09	INF\$04	9	M36	\$41	\$6B	\$15	\$49	\$04	\$24	\$00	\$00	\$00	\$00
1850PWM	ECU6	SID\$09	INF\$05	9		\$41	\$6B	\$15	\$49	\$05	\$09				
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1850PWM	ECU6	SID\$09	INF\$06	9	M7	\$41	\$6B	\$15	\$49	\$06	\$07	\$6D	\$91	\$BC	\$82
1850PWM	ECU6	SID\$09	INF\$06	9	M8	\$41	\$6B	\$15	\$49	\$06	\$08	\$6E	\$55	\$AA	\$81
1850PWM	ECU6	SID\$09	INF\$06	9	M9	\$41	\$6B	\$15	\$49	\$06	\$09	\$6F	\$FF	\$00	\$80
1850PWM	ECU7	SID\$09	INF\$00			\$41	\$6B	\$16	\$49	\$00	\$3C	\$00	\$00	\$00	
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1850PWM	ECU7	SID\$09	INF\$04	9	M1	\$41	\$6B	\$16	\$49	\$04	\$01	\$31	\$37	\$35	\$38
1850PWM	ECU7	SID\$09	INF\$04	9	M2	\$41	\$6B	\$16	\$49	\$04	\$02	\$39	\$37	\$37	\$38
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1850PWM	ECU7	SID\$09	INF\$04	9	M11	\$41	\$6B	\$16	\$49	\$04	\$0B	\$00	\$00	\$00	\$00
1850PWM	ECU7	SID\$09	INF\$04	9	M12	\$41	\$6B	\$16	\$49	\$04	\$0C	\$00	\$00	\$00	\$00
1850PWM	ECU7	SID\$09	INF\$04	9	M13	\$41	\$6B	\$16	\$49	\$04	\$0D	\$34	\$37	\$35	\$38
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1850PWM	ECU7	SID\$09	INF\$04	9	M15	\$41	\$6B	\$16	\$49	\$04	\$0F	\$00	\$00	\$00	\$00
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1850PWM	ECU7	SID\$09	INF\$04	9	M17	\$41	\$6B	\$16	\$49	\$04	\$11	\$35	\$37	\$35	\$38
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1850PWM	ECU7	SID\$09	INF\$04	9	M25	\$41	\$6B	\$16	\$49	\$04	\$19	\$37	\$37	\$35	\$38
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1850PWM	ECU7	SID\$09	INF\$04	9	M29	\$41	\$6B	\$16	\$49	\$04	\$1D	\$38	\$37	\$35	\$38
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1850PWM	ECU7	SID\$09	INF\$04	9	M32	\$41	\$6B	\$16	\$49	\$04	\$20	\$00	\$00	\$00	\$00
1850PWM	ECU7	SID\$09	INF\$04	9	M33	\$41	\$6B	\$16	\$49	\$04	\$21	\$39	\$37	\$35	\$38
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1850PWM	ECU7	SID\$09	INF\$06	9	M2	\$41	\$6B	\$16	\$49	\$06	\$02	\$78	\$91	\$BC	\$87
1850PWM	ECU7	SID\$09	INF\$06	9	M3	\$41	\$6B	\$16	\$49	\$06	\$03	\$79	\$91	\$BC	\$86
1850PWM	ECU7	SID\$09	INF\$06	9	M4	\$41	\$6B	\$16	\$49	\$06	\$04	\$7A	\$91	\$BC	\$85
1850PWM	ECU7	SID\$09	INF\$06	9	M5	\$41	\$6B	\$16	\$49	\$06	\$05	\$7B	\$91	\$BC	\$84
1850PWM	ECU7	SID\$09	INF\$06	9	M6	\$41	\$6B	\$16	\$49	\$06	\$06	\$7C	\$91	\$BC	\$83

1850PWM	ECU7	SID\$09	INF\$06	9	M7	\$41	\$6B	\$16	\$49	\$06	\$07	\$7D	\$91	\$BC	\$82
1850PWM	ECU7	SID\$09	INF\$06	9	M8	\$41	\$6B	\$16	\$49	\$06	\$08	\$7E	\$55	\$AA	\$81
1850PWM	ECU7	SID\$09	INF\$06	9	M9	\$41	\$6B	\$16	\$49	\$06	\$09	\$7F	\$FF	\$00	\$80
1850PWM	ECU8	SID\$09	INF\$00			\$41	\$6B	\$17	\$49	\$00	\$3C	\$00	\$00	\$00	\$00
1850PWM	ECU8	SID\$09	INF\$03	9		\$41	\$6B	\$17	\$49	\$03	\$24				
1850PWM	ECU8	SID\$09	INF\$04	9	M1	\$41	\$6B	\$17	\$49	\$04	\$01	\$31	\$38	\$35	\$38
1850PWM	ECU8	SID\$09	INF\$04	9	M2	\$41	\$6B	\$17	\$49	\$04	\$02	\$39	\$37	\$37	\$38
1850PWM	ECU8	SID\$09	INF\$04	9	M3	\$41	\$6B	\$17	\$49	\$04	\$03	\$00	\$00	\$00	\$00
1850PWM	ECU8	SID\$09	INF\$04	9	M4	\$41	\$6B	\$17	\$49	\$04	\$04	\$00	\$00	\$00	\$00
1850PWM	ECU8	SID\$09	INF\$04	9	M5	\$41	\$6B	\$17	\$49	\$04	\$05	\$32	\$38	\$35	\$38
1850PWM	ECU8	SID\$09	INF\$04	9	M6	\$41	\$6B	\$17	\$49	\$04	\$06	\$39	\$37	\$37	\$37
1850PWM	ECU8	SID\$09	INF\$04	9	M7	\$41	\$6B	\$17	\$49	\$04	\$07	\$00	\$00	\$00	\$00
1850PWM	ECU8	SID\$09	INF\$04	9	M8	\$41	\$6B	\$17	\$49	\$04	\$08	\$00	\$00	\$00	\$00
1850PWM	ECU8	SID\$09	INF\$04	9	M9	\$41	\$6B	\$17	\$49	\$04	\$09	\$33	\$38	\$35	\$38
1850PWM	ECU8	SID\$09	INF\$04	9	M10	\$41	\$6B	\$17	\$49	\$04	\$0A	\$39	\$37	\$37	\$36
1850PWM	ECU8	SID\$09	INF\$04	9	M11	\$41	\$6B	\$17	\$49	\$04	\$0B	\$00	\$00	\$00	\$00
1850PWM	ECU8	SID\$09	INF\$04	9	M12	\$41	\$6B	\$17	\$49	\$04	\$0C	\$00	\$00	\$00	\$00
1850PWM	ECU8	SID\$09	INF\$04	9	M13	\$41	\$6B	\$17	\$49	\$04	\$0D	\$34	\$38	\$35	\$38
1850PWM	ECU8	SID\$09	INF\$04	9	M14	\$41	\$6B	\$17	\$49	\$04	\$0E	\$39	\$37	\$37	\$35
1850PWM	ECU8	SID\$09	INF\$04	9	M15	\$41	\$6B	\$17	\$49	\$04	\$0F	\$00	\$00	\$00	\$00
1850PWM	ECU8	SID\$09	INF\$04	9	M16	\$41	\$6B	\$17	\$49	\$04	\$10	\$00	\$00	\$00	\$00
1850PWM	ECU8	SID\$09	INF\$04	9	M17	\$41	\$6B	\$17	\$49	\$04	\$11	\$35	\$38	\$35	\$38
1850PWM	ECU8	SID\$09	INF\$04	9	M18	\$41	\$6B	\$17	\$49	\$04	\$12	\$39	\$37	\$37	\$34
1850PWM	ECU8	SID\$09	INF\$04	9	M19	\$41	\$6B	\$17	\$49	\$04	\$13	\$00	\$00	\$00	\$00
1850PWM	ECU8	SID\$09	INF\$04	9	M20	\$41	\$6B	\$17	\$49	\$04	\$14	\$00	\$00	\$00	\$00
1850PWM	ECU8	SID\$09	INF\$04	9	M21	\$41	\$6B	\$17	\$49	\$04	\$15	\$36	\$38	\$35	\$38
1850PWM	ECU8	SID\$09	INF\$04	9	M22	\$41	\$6B	\$17	\$49	\$04	\$16	\$39	\$37	\$37	\$33
1850PWM	ECU8	SID\$09	INF\$04	9	M23	\$41	\$6B	\$17	\$49	\$04	\$17	\$00	\$00	\$00	\$00
1850PWM	ECU8	SID\$09	INF\$04	9	M24	\$41	\$6B	\$17	\$49	\$04	\$17	\$00	\$00	\$00	\$00
1850PWM	ECU8	SID\$09	INF\$04	9	M25	\$41	\$6B	\$17	\$49	\$04	\$19	\$37	\$38	\$35	\$38
1850PWM	ECU8	SID\$09	INF\$04	9	M26	\$41	\$6B	\$17	\$49	\$04	\$1A	\$39	\$37	\$37	\$32
1850PWM	ECU8	SID\$09	INF\$04	9	M27	\$41	\$6B	\$17	\$49	\$04	\$1B	\$00	\$00	\$00	\$00
1850PWM	ECU8	SID\$09	INF\$04	9	M28	\$41	\$6B	\$17	\$49	\$04	\$1C	\$00	\$00	\$00	\$00
1850PWM	ECU8	SID\$09	INF\$04	9	M29	\$41	\$6B	\$17	\$49	\$04	\$1D	\$38	\$38	\$35	\$38
1850PWM	ECU8	SID\$09	INF\$04	9	M30	\$41	\$6B	\$17	\$49	\$04	\$1E	\$39	\$37	\$37	\$31
1850PWM	ECU8	SID\$09	INF\$04	9	M31	\$41	\$6B	\$17	\$49	\$04	\$1F	\$00	\$00	\$00	\$00
1850PWM	ECU8	SID\$09	INF\$04	9	M32	\$41	\$6B	\$17	\$49	\$04	\$20	\$00	\$00	\$00	\$00
1850PWM	ECU8	SID\$09	INF\$04	9	M33	\$41	\$6B	\$17	\$49	\$04	\$21	\$39	\$38	\$35	\$38
1850PWM	ECU8	SID\$09	INF\$04	9	M34	\$41	\$6B	\$17	\$49	\$04	\$22	\$39	\$37	\$37	\$30
1850PWM	ECU8	SID\$09	INF\$04	9	M35	\$41	\$6B	\$17	\$49	\$04	\$23	\$00	\$00	\$00	\$00
1850PWM	ECU8	SID\$09	INF\$04	9	M36	\$41	\$6B	\$17	\$49	\$04	\$24	\$00	\$00	\$00	\$00
1850PWM	ECU8	SID\$09	INF\$05	9		\$41	\$6B	\$17	\$49	\$05	\$09				
1850PWM	ECU8	SID\$09	INF\$06	9	M1	\$41	\$6B	\$17	\$49	\$06	\$01	\$87	\$91	\$BC	\$88
1850PWM	ECU8	SID\$09	INF\$06	9	M2	\$41	\$6B	\$17	\$49	\$06	\$02	\$88	\$91	\$BC	\$87
1850PWM	ECU8	SID\$09	INF\$06	9	M3	\$41	\$6B	\$17	\$49	\$06	\$03	\$89	\$91	\$BC	\$86
1850PWM	ECU8	SID\$09	INF\$06	9	M4	\$41	\$6B	\$17	\$49	\$06	\$04	\$8A	\$91	\$BC	\$85
1850PWM	ECU8	SID\$09	INF\$06	9	M5	\$41	\$6B	\$17	\$49	\$06	\$05	\$8B	\$91	\$BC	\$84
1850PWM	ECU8	SID\$09	INF\$06	9	M6	\$41	\$6B	\$17	\$49	\$06	\$06	\$8C	\$91	\$BC	\$83
1850PWM	ECU8	SID\$09	INF\$06	9	M7	\$41	\$6B	\$17	\$49	\$06	\$07	\$8D	\$91	\$BC	\$82
1850PWM	ECU8	SID\$09	INF\$06	9	M8	\$41	\$6B	\$17	\$49	\$06	\$08	\$8E	\$55	\$AA	\$81
1850PWM	ECU8	SID\$09	INF\$06	9	M9	\$41	\$6B	\$17	\$49	\$06	\$09	\$8F	\$FF	\$00	\$80

Figure 24 - Pre-defined messages for SAE J1850 PWM

5.4.7.4 SAE J1850 PWM Message Timing

For convenience, the test cases in this document will use the text in the 'Parameter Reference' column when referring to the specific value, detailed in the 'Value' column of the table below. Unless otherwise specified, the following timing values shall be used:

Parameter Reference	Value
P2_MIN	0 ms
P2	25 ms
P2_MAX	100 ms

Figure 25 - Pre-defined message timing for SAE J1850 PWM

5.4.7.5 SAE J1850 PWM Connected State

The device shall initially be in the 'Power On' state, connected to the SAE J1850 network with the appropriate termination applied (as depicted in 5.4.7.1).

5.4.7.6 SAE J1850 PWM (2 ECUs) Initialized State

The OBD network shall have determined to be SAE J1850 PWM at a baud rate of 41600 with two OBD II ECUs having been identified. The DUT may produce a periodic message transmission to keep the network alive. A successful completion of 0 shall define this state.

5.4.7.7 SAE J1850 PWM (8 ECUs) Initialized State

The OBD network shall have determined to be SAE J1850 PWM at a baud rate of 41600 with eight OBD II ECUs having been identified. The DUT may produce a periodic message transmission to keep the network alive. A successful completion of 8.6.2 shall define this state.

5.4.7.8 SAE J1850 PWM (2 ECUs) SID9 Ready State

The SID \$09 INFOTYPES shall be known for each of the two OBD II ECUs on the network. The DUT may produce a periodic message transmission to keep the network alive. A successful completion of 9.6.17 shall define this state.

5.4.7.9 SAE J1850 PWM (2 ECUs) SID9 Diesel Ready State

The SID \$09 INFOTYPES shall be known for each of the two OBD II ECUs on the network. The DUT may produce a periodic message transmission to keep the network alive. A successful completion of 1.1.1 shall define this state.

5.4.7.10 SAE J1850 PWM (8 ECUs) SID9 Ready State

The SID \$09 INFOTYPES shall be known for each of the eight OBD II ECUs on the network. The DUT may produce a periodic message transmission to keep the network alive. A successful completion of 0 shall define this state.

6. MECHANICAL EVALUATION

This section details test cases that will verify the mechanical attributes of the DUT.

6.1 General Tests

These are general mechanical tests, which are not specific to any OBD II network.

6.1.1 Verify Mechanical Dimensions for SAE J1962 Connector Head

6.1.2 Verify SAE J1962 Cable Length

7. ELECTRICAL EVALUATION

This section details test cases that will verify the electrical attributes of the DUT.

7.1 General Tests

These are general electrical tests, which are not specific to any OBD II protocol.

7.1.1 Verify the Current Draw of DUT

Test ID:	\$10002000
Purpose:	The purpose of this test is to verify that the DUT will not exceed the maximum 4.0 A current limit over the 8.0 to 18.0 voltage range.
Rationale:	This test will confirm that the DUT never draws too much power.
Set Up:	Connect the DUT to the variable power supply (PS #1) as outlined in Figure 26. The positive terminal of PS #1 shall be connected to pin 16 on the DUT's SAE J1962 connector. The negative terminal of PS #1 shall be connected to pins 4 and 5 on the DUT's SAE J1962 connector. If the DUT requires an external power source (other than the SAE J1962 connector), be sure to connect it and verify that it is providing power to the DUT.
Procedure:	
<u>ACTION- INST</u>	Set the PS #1 to 8 V DC, then measure the voltage V1 and V2 as well as current A1, A2, and A3.
<u>EVALUATION</u>	Pass if all of the following conditions are true: 8.0 V DC $\leq$ V1 $\leq$ 18.0 V DC, 8.0 V DC $\leq$ V2 $\leq$ 18.0 V DC, A1 $\leq$ 4.0 A, A2 $\leq$ 1.5 A, A3 $\leq$ 4.0 A.
<u>ACTION- INST</u>	Set the PS #1 to 12.5 V DC, then measure the voltage V1 and V2 as well as current A1, A2, and A3.
<u>EVALUATION</u>	Pass if all of the following conditions are true: 8.0 V DC $\leq$ V1 $\leq$ 18.0 V DC, 8.0 V DC $\leq$ V2 $\leq$ 18.0 V DC, A1 $\leq$ 4.0 A, A2 $\leq$ 1.5 A, A3 $\leq$ 4.0 A.
<u>ACTION- INST</u>	Set the PS #1 to 18 V DC, then measure the voltage V1 and V2 as well as current A1, A2, and A3.
<u>EVALUATION</u>	Pass if all of the following conditions are true: 8.0 V DC $\leq$ V1 $\leq$ 18.0 V DC, 8.0 V DC $\leq$ V2 $\leq$ 18.0 V DC, A1 $\leq$ 4.0 A, A2 $\leq$ 1.5 A, A3 $\leq$ 4.0 A.

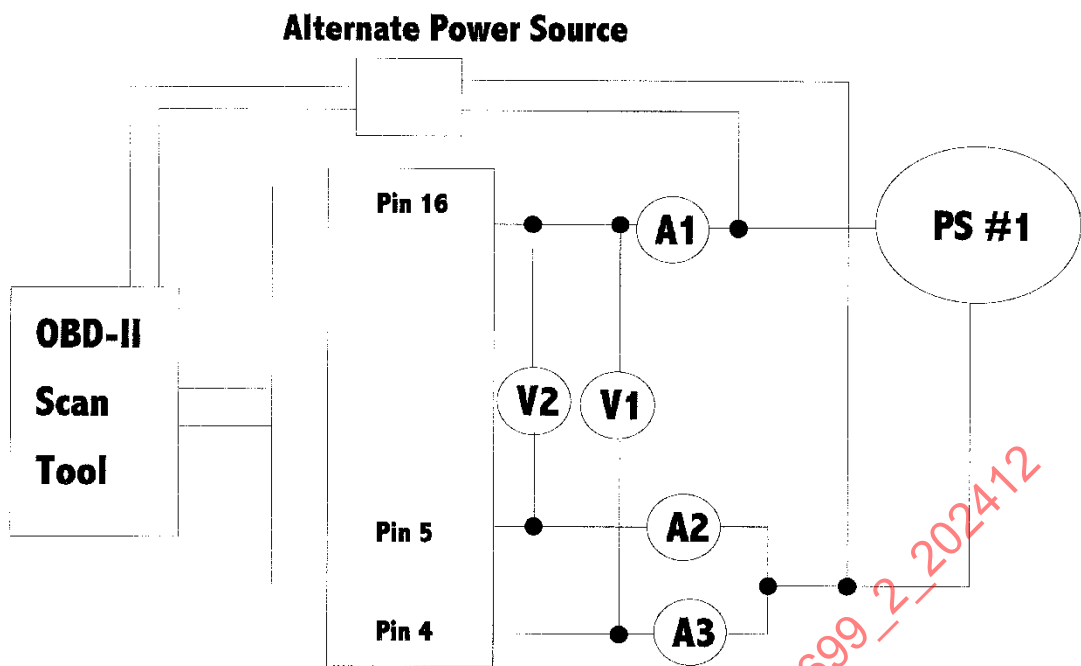


Figure 26 - DUT current draw validation circuit

7.2 ISO 15765-4 Tests

These electrical tests are specific to ISO 15765-4.

7.2.1 Verify Network Termination

Test ID:	\$10104000
Purpose:	The purpose of this test is to determine if the network has the specified termination.
Rationale:	This test will confirm that there is no termination being applied by the DUT.
Set Up:	The DUT shall be in the “ISO 15765 (11-bit, 500K) Connected State” as defined in 5.4.3.7 with the ISO 15765-4 network connected to the ECUSIM. The ECUSIM shall be in the “ISO 15765 (11-bit, 500K) Connected State” as defined in 5.4.3.7.
Procedure:	
ACTION- INST	Measure the resistance between pin 6 (CAN H) and pin 14 (CAN L) on the DUT’s SAE J1962 connector.
EVALUATION	Pass if the resistance measurement is 500K Ohm or greater.

7.2.2 Verify Capacitance

Test ID:	\$10103000
Purpose:	The purpose of this test is to determine the capacitance applied by the DUT.
Rationale:	This test will confirm that the DUT is providing the correct amount of capacitance
Set Up:	The DUT shall be in the "ISO 15765 (11-bit, 500K) Connected State" as defined in 5.4.3.7 with the ISO 15765-4 network connected to the ECUSIM. The ECUSIM shall be in the "ISO 15765 (11-bit, 500K) Connected State" as defined in 5.4.3.7.
Procedure:	
<u>ACTION- INST</u>	Measure the capacitance between pin 5 (Signal Ground) and pin 6 (CAN H) on the DUT's SAE J1962 connector.
<u>EVALUATION</u>	Pass if the value is less than 100pF.
<u>ACTION- INST</u>	Measure the capacitance between pin 5 (Signal Ground) and pin 14 (CAN L) on the DUT's SAE J1962 connector.
<u>EVALUATION</u>	Pass if the value is less than 100pF.
<u>ACTION- INST</u>	Measure the capacitance between pin 6 (CAN H) and pin 14 (CAN L) on the DUT's SAE J1962 connector.
<u>EVALUATION</u>	Pass if the value is less than 50pF.

7.3 ISO 14230-4 Tests

These electrical tests are specific to ISO 14230-4.

7.3.1 Verify Network Termination

Test ID:	\$10204000
Purpose:	The purpose of this test is to determine if the network has the specified termination.
Rationale:	This test will confirm that the DUT is providing a pull-up to vehicle battery.
Set Up:	The DUT and ECUSIM shall be in the "ISO 14230-4 (2 ECUs) Initialized State", which is detailed in 5.4.4.6.
Procedure:	
<u>ACTION- INST</u>	Measure the voltage between pin 7 (K Line) and pin 4 (chassis ground) on the DUT's SAE J1962 connector.
<u>EVALUATION</u>	Pass if the voltage is greater than 90% of vehicle battery.
<u>ACTION- INST</u>	Measure the voltage between pin 15 (K Line) and pin 4 (chassis ground) on the DUT's SAE J1962 connector.
<u>EVALUATION</u>	Pass if the voltage is greater than 90% of vehicle battery.

7.3.2 Verify Capacitance

Test ID:	\$10203000
Purpose:	The purpose of this test is to determine the capacitance applied by the DUT.
Rationale:	This test will confirm that the DUT is providing the correct amount of capacitance
Set Up:	The DUT and ECUSIM shall be in the "ISO 14230-4 (2 ECUs) Initialized State", which is detailed in 5.4.4.6.
Procedure:	
<u>ACTION- INST</u>	Measure the capacitance between pin 5 (Signal Ground) and pin 7 (K Line) on the DUT's SAE J1962 connector.
<u>EVALUATION</u>	Pass if the value is less than 2nF.
<u>ACTION- INST</u>	Measure the capacitance between pin 5 (Signal Ground) and pin 15 (L Line) on the DUT's SAE J1962 connector.
<u>EVALUATION</u>	Pass if the value is less than 2nF.

7.4 ISO 9141-2 Tests

These electrical tests are specific to ISO 9141-2.

7.4.1 Verify Network Termination

Test ID:	\$10304000
Purpose:	The purpose of this test is to determine if the network has the specified termination.
Rationale:	This test will confirm that the DUT is providing a pull-up to vehicle battery.
Set Up:	The DUT and ECUSIM shall be in the "ISO 9141-2 (2 ECUs) Initialized State", which is detailed in 5.4.5.6.
Procedure:	
<u>ACTION- INST</u>	Measure the voltage between pin 7 (K Line) and pin 4 (chassis ground) on the DUT's SAE J1962 connector.
<u>EVALUATION</u>	Pass if the voltage is greater than 90% of vehicle battery.
<u>ACTION- INST</u>	Measure the voltage between pin 15 (K Line) and pin 4 (chassis ground) on the DUT's SAE J1962 connector.
<u>EVALUATION</u>	Pass if the voltage is greater than 90% of vehicle battery.

7.4.2 Verify Capacitance

Test ID:	\$10304000
Purpose:	The purpose of this test is to determine the capacitance applied by the DUT.
Rationale:	This test will confirm that the DUT is providing the correct amount of capacitance
Set Up:	The DUT and ECUSIM shall be in the “ISO 9141-2 (2 ECUs) Initialized State”, which is detailed in 5.4.5.6.
Procedure:	
<u>ACTION- INST</u>	Measure capacitance on the DUT's SAE J1962 connector.
<u>EVALUATION</u>	Pass if the value is less than 2nF

7.5 SAE J1850 VPW Tests

These electrical tests are specific to SAE J1850 VPW and are specified in SAE J1699-1.

7.6 SAE J1850 PWM Tests

These electrical tests are specific to SAE J1850 PWM and are specified in SAE J1699-1.

8. PROTOCOL EVALUATION

This section details test cases that will verify the protocol attributes (such as, correct signal timing, transport layer implementation, etc.) of the DUT.

8.1 General Tests

These are general protocol tests, which are not specific to any OBD II protocol.

8.1.1 Verify OBD II Initialization Sequence

Test ID:	\$20003000
Purpose:	The purpose of this test is to determine if the DUT is attempting to establish communications on ISO 9141-2, ISO 14230-4, J1850 PWM, J1850 VPW, ISO 15765-4 (11-bit, 500K), and ISO 15765-4 (29-bit, 500K). Where applicable, the appropriate delays shall be checked between attempts for protocols that use the same physical layers.
Rationale:	This test will confirm that all OBD interfaces are checked once per scan and that the polling rates do not exceed those specified ISO 15031-5.
Set Up:	The DUT shall be in the "Power On" state as defined in 5.4.1.1. An oscilloscope shall be connected to the ISO 9141-2 network to measure the timing of voltage transitions during the initialization process.
Procedure:	
<u>ACTION- DUT</u>	Initiate the OBD II protocol scan and allow the DUT to make two passes through the protocol scan process.
<u>EVALUATION</u>	Pass if the following is true: There was an attempt to do a K-Line 5-Baud Initialization (Verify that both K and L Lines at idle [logic '1'] for the time specified in <i>W5</i>. Then both K and L Lines transmit the byte \$33 at 5-bits per second $\pm 0.5\%$.), ISO 14230-4 Fast Initialization (Verify that the K Line was at logic '1' for at least <i>W5</i> before changing to logic '0' for <i>TiniL</i> then returning to a logic '1' for the remainder of <i>Twup</i>. Then verify that the message 14230_START_COMM was transmitted.) at 10.4k baud, J1850 PWM 1850PWM_SID\$01_PID\$00 message was transmitted at 41.6k baud, J1850 VPW 1850VPW_SID\$01_PID\$00 message was transmitted at 10.4k baud, ISO 15765-4 (11-bit) 15765_11_SID\$01_PID\$00 message was transmitted at 500K baud, and ISO 15765-4 (29-bit) 15765_29_SID\$01_PID\$00 message was transmitted at 500K baud - at least twice for each protocol, in no specific order, without user intervention. There was at least a 2.6 second delay (2 seconds for the address at 5 baud + <i>W1</i> + <i>W5</i>) between start of ISO 14230-4 Fast Initialization and the start of K-Line 5-Baud Initialization.

Figure 27 - Verify OBD II initialization sequence

8.2 ISO 15765-4 Tests

These protocol tests are specific to ISO 15765-4. Unless otherwise specified, all references to Electrical Connections, ECU Addresses, Messages, Message Timing, and pre-defined states will be as described in 5.4.3.

8.2.1 Test BS and STMIN are 0 (11-bit, 500K)

Test ID:	\$20102000
Purpose:	The purpose of this test is to verify that the DUT issues the correct flow control message in response to a previous request.
Rationale:	This test will use positive responses from a single ECU.
Set Up:	The DUT shall be in the "ISO 15765 (11-bit, 500K) Connected State" as defined in 5.4.3.7 with the ISO 15765-4 network connected to the ECUSIM. The ECUSIM shall be in the "CAN (11-bit, 500K) Connected State" as defined in 5.4.2.4.
Procedure:	
<u>ACTION- DUT</u>	Initiate the request for SID \$09 INF \$04 (CALID).
<u>EVALUATION</u>	Pass if the CAN_11_SID\$09_INF\$04 message was transmitted
<u>ACTION- ECUSIM</u>	After the <i>P2</i> delay, transmit the message CAN_11_ECU1_SID\$09_INF\$04_FF .
<u>EVALUATION</u>	Pass if the transmission is successful.
<u>ACTION- DUT</u>	In response to the ECUSIM First Frame message, the DUT should automatically issue an ISO 15765 Flow Control frame.
<u>EVALUATION</u>	Pass if the following is true: The CAN_11_FC_BS0_STMIN0 message was transmitted within 1000mS of the successful transmission of the CAN_11_ECU1_SID\$09_INF\$04_FF message. The DUT recognizes that the message transmission was aborted and automatically recovers.

Figure 28 - Test ISO 15765-4 protocol BS and STMIN are 0 (11-bit, 500K)

8.2.2 Verify Protocol Initialization (11-bit, 500K)

Test ID:	\$20103000
Purpose:	The purpose of this test is to verify that the DUT can successfully perform an OBD II initialization on the ISO 15765-4 network with 11-bit CAN Identifiers.
Rationale:	This test will use positive responses from two different ECUs.
Set Up:	The DUT shall be in the “ISO 15765 (11-bit, 500K) Connected State” as defined in 5.4.3.7 with the ISO 15765-4 network connected to the ECUSIM. The ECUSIM shall be in the “ISO 15765 (11-bit, 500K) Connected State” as defined in 5.4.3.7.
Procedure:	
<u>ACTION- DUT</u>	Initiate the OBD II protocol scan.
<u>EVALUATION</u>	Pass if the 15765_11_SID\$01_PID\$00 message was transmitted.
<u>ACTION- ECUSIM</u>	After the <i>P2</i> delay, transmit the message ISO15765_11_ ECU1_SID\$01_PID\$00 , delay <i>P2</i> , then transmit the message 15765_11_ECU2_SID\$01_PID\$00 .
<u>EVALUATION</u>	Pass if transmission is successful and the DUT identifies the OBD II protocol as ISO 15765-4 with 2 ECUs.

Figure 29 - Verify ISO 15765-4 protocol initialization (11-bit, 500K)

8.2.3 Verify Protocol Initialization (29-bit, 500K)

Test ID:	\$20103001
Purpose:	The purpose of this test is to verify that the DUT can successfully perform an OBD II initialization on the ISO 15765-4 network with 29-bit CAN Identifiers.
Rationale:	This test will use positive responses from two different ECUs.
Set Up:	The DUT shall be in the “ISO 15765 (29-bit, 500K) Connected State” as defined in 5.4.3.8 with the ISO 15765-4 network connected to the ECUSIM. The ECUSIM shall be in the “ISO 15765 (29-bit, 500K) Connected State” as defined in 5.4.3.8.
Procedure:	
<u>ACTION- DUT</u>	Initiate the OBD II protocol scan.
<u>EVALUATION</u>	Pass if the 15765_29_SID\$01_PID\$00 message was transmitted.
<u>ACTION- ECUSIM</u>	After the <i>P2</i> delay, transmit the message 15765_29_ECU1_SID\$01_PID\$00 , delay <i>P2</i> , then transmit the message 15765_29_ECU2_SID\$01_PID\$00 .
<u>EVALUATION</u>	Pass if transmission is successful and the DUT identifies the OBD II protocol as ISO 15765-4 with 2 ECUs.

Figure 30 - Verify ISO 15765-4 protocol initialization (29-bit, 500K)

8.2.4 Verify Protocol Initialization with 8 ECUs (11-bit, 500K)

Test ID:	\$20103002
Purpose:	The purpose of this test is to verify that the DUT can successfully perform an OBD II initialization on the ISO 15765-4 network with 11-bit CAN Identifiers when 8 ECUs are present.
Rationale:	This test will use positive responses from eight different ECUs with ECU3 through ECU8 indicating that no SID \$01 PIDs are supported.
Set Up:	The DUT shall be in the "ISO 15765 (11-bit, 500K) Connected State" as defined in 5.4.3.7 with the ISO 15765-4 network connected to the ECUSIM. The ECUSIM shall be in the "ISO 15765 (11-bit, 500K) Connected State" as defined in 5.4.3.7.
Procedure:	
<u>ACTION- DUT</u>	Initiate the OBD II protocol scan.
<u>EVALUATION</u>	Pass if the 15765_11_SID\$01_PID\$00 message was transmitted
<u>ACTION- ECUSIM</u>	Delay <i>P2_MIN</i> , then transmit the message 15765_11_ECU1_SID\$01_PID\$00 . Delay <i>P2_MIN</i> , then transmit the message 15765_11_ECU2_SID\$01_PID\$00 . Delay <i>P2_MIN</i> , then transmit the message 15765_11_ECU3_SID\$01_PID\$00 . Delay <i>P2_MIN</i> , then transmit the message 15765_11_ECU4_SID\$01_PID\$00 . Delay <i>P2_MIN</i> , then transmit the message 15765_11_ECU5_SID\$01_PID\$00 . Delay <i>P2_MIN</i> , then transmit the message 15765_11_ECU6_SID\$01_PID\$00 . Delay <i>P2_MIN</i> , then transmit the message 15765_11_ECU7_SID\$01_PID\$00 . Delay <i>P2_MIN</i> , then transmit the message 15765_11_ECU8_SID\$01_PID\$00 .
<u>EVALUATION</u>	Pass if transmission is successful and the DUT identifies the OBD II protocol as ISO 15765-4 with 8 ECUs.

Figure 31 - Verify ISO 15765-4 protocol initialization with 8 ECUs (11-bit, 500K)

8.2.5 Verify Protocol Initialization with 8 ECUs (29-bit, 500K)

Test ID:	\$20103003
Purpose:	The purpose of this test is to verify that the DUT can successfully perform an OBD II initialization on the ISO 15765-4 network with 29-bit CAN Identifiers when 8 ECUs are present.
Rationale:	This test will use positive responses from eight different ECUs with ECU3 through ECU8 indicating that no SID \$01 PIDs are supported.
Set Up:	The DUT shall be in the "ISO 15765 (29-bit, 500K) Connected State" as defined in 5.4.3.8 with the ISO 15765-4 network connected to the ECUSIM. The ECUSIM shall be in the "ISO 15765 (29-bit, 500K) Connected State" as defined in 5.4.3.8.
Procedure:	
<u>ACTION- DUT</u>	Initiate the OBD II protocol scan.
<u>EVALUATION</u>	Pass if the 15765_29_SID\$01_PID\$00 message was transmitted.
<u>ACTION- ECUSIM</u>	Delay <i>P2_MIN</i> , then transmit the message 15765_29_ECU1_SID\$01_PID\$00 . Delay <i>P2_MIN</i> , then transmit the message 15765_29_ECU2_SID\$01_PID\$00 . Delay <i>P2_MIN</i> , then transmit the message 15765_29_ECU3_SID\$01_PID\$00 . Delay <i>P2_MIN</i> , then transmit the message 15765_29_ECU4_SID\$01_PID\$00 . Delay <i>P2_MIN</i> , then transmit the message 15765_29_ECU5_SID\$01_PID\$00 . Delay <i>P2_MIN</i> , then transmit the message 15765_29_ECU6_SID\$01_PID\$00 . Delay <i>P2_MIN</i> , then transmit the message 15765_29_ECU7_SID\$01_PID\$00 . Delay <i>P2_MIN</i> , then transmit the message 15765_29_ECU8_SID\$01_PID\$00 .
<u>EVALUATION</u>	Pass if transmission is successful and the DUT identifies the OBD II protocol as ISO 15765-4 with 8 ECUs.

Figure 32 - Verify ISO 15765-4 protocol initialization with 8 ECUs (29-bit, 500K)

8.2.6 Test Protocol Initialization with No Acknowledgement (11-bit, 500K)

Test ID:	\$20103004
Purpose:	The purpose of this test is to verify that the DUT will retry transmission for at least 25 ms, the time needed to wake up a deactivated/sleeping module or win the arbitration, when a CAN frame is unacknowledged.
Rationale:	This test will not provide any ECU responses.
Set Up:	The DUT shall be in the "ISO 15765 (11-bit, 500K) Connected State" as defined in 5.4.3.7 with the ISO 15765-4 network connected to the ECUSIM. The ECUSIM shall be in the "ISO 15765 (11-bit, 500K) Monitor State" as defined in 5.4.3.5.
Procedure:	
<u>ACTION- DUT</u>	Initiate the OBD II protocol scan.
<u>EVALUATION</u>	Pass if the following is true: The 15765_11_SID\$01_PID\$00 message was re-transmitted approximately every 260 ms (average transmission time of a single CAN-frame with 11-bit CAN-ID, DLC=8 at 500K Baud) on the bus. The time between the first transmission and the last retry from the DUT is ≥ 25 ms (approx. 96 CAN-frames).

Figure 33 - Test ISO 15765-4 protocol initialization with no acknowledgement (11-bit, 500K)

8.2.7 Verify Protocol Initialization with Delayed Acknowledgement (11-bit, 500K)

Test ID:	\$20103005
Purpose:	The purpose of this test is to verify that the DUT will successfully initialize even when there are unacknowledged CAN frames.
Rationale:	This test will delay (with no In-Frame Acknowledgements) before using positive responses from two different ECUs.
Set Up:	The DUT shall be in the "ISO 15765 (11-bit, 500K) Connected State" as defined in 5.4.3.7 with the ISO 15765-4 network connected to the ECUSIM. The ECUSIM shall be in the "ISO 15765 (11-bit, 500K) Monitor State" as defined in 5.4.3.5.
Procedure:	
<u>ACTION- DUT</u>	Initiate the OBD II protocol scan.
<u>EVALUATION</u>	Pass if the following is true: The 15765_11_SID\$01_PID\$00 message was re-transmitted approximately every 260 ms (average transmission time of a single CAN-frame with 11-bit CAN-ID, DLC=8 at 500K Baud) on the bus.
<u>ACTION- ECUSIM</u>	After a delay of 20 ms, the ECUSIM shall begin generating In-Frame Acknowledgements, delay <i>P2</i> , transmit the message 15765_11_ECU1_SID\$01_PID\$00 , delay <i>P2</i> , then transmit the message 15765_11_ECU2_SID\$01_PID\$00 .
<u>EVALUATION</u>	Pass if transmission is successful and the DUT identifies the OBD II protocol as ISO 15765-4 with 2 ECUs.

Figure 34 - Verify ISO 15765-4 protocol initialization with delayed acknowledgement (11-bit, 500K)

8.2.8 Test Protocol Initialization with Error Frame Detected (11-bit, 500K)

Test ID:	\$20103006
Purpose:	The purpose of this test is to verify that the DUT will detect an error during transmission of a CAN frame and disconnect itself from the bus.
Rationale:	This test will generate an error condition on the ISO 15765-4 network.
Set Up:	The DUT shall be in the "ISO 15765 (11-bit, 500K) Connected State" as defined in 5.4.3.7 with the ISO 15765-4 network connected to the ECUSIM. The ECUSIM shall be in the "ISO 15765 (11-bit, 250K) Monitor State" as defined in 5.4.3.5.
Procedure:	
<u>ACTION- DUT</u>	Initiate the OBD II protocol scan.
<u>EVALUATION</u>	Pass if the following is true: The 15765_11_SID\$01_PID\$00 message stopped transmission after an error frame was transmitted on the bus.

Figure 35 - Test ISO 15765-4 protocol initialization with error frame detected (11-bit, 500K)

8.2.9 Verify Protocol Initialization with NRC=\$21 (11-bit, 500K)

Test ID:	\$20103007
Purpose:	The purpose of this test is to verify that the DUT will successfully initialize when there are 5 NRC of \$21 in a row.
Rationale:	This test will use a positive response from the first ECU and a negative 'busy' response from a second ECU; five times in a row.
Set Up:	The DUT shall be in the "ISO 15765 (11-bit, 500K) Connected State" as defined in 5.4.3.7 with the ISO 15765-4 network connected to the ECUSIM. The ECUSIM shall be in the "ISO 15765 (11-bit, 500K) Connected State" as defined in 5.4.3.7.
Procedure:	
<u>ACTION- DUT</u>	Initiate the OBD II protocol scan.
<u>EVALUATION</u>	Pass if the 15765_11_SID\$01_PID\$00 message was transmitted.
<u>ACTION- ECUSIM</u>	Delay <i>P2</i> , then transmit the ISO15765_11_ECU2_SID\$01_PID\$00 message, delay <i>P2</i> , then transmit the ISO15765_11_ECU1_SID\$01_NRC\$21 message.
<u>EVALUATION</u>	Pass if the messages were successfully transmitted.
<u>ACTION- DUT</u>	The DUT re-transmits the 15765_11_SID\$01_PID\$00 message.
<u>EVALUATION</u>	Pass if the message was transmitted $\geq$ 200 ms after the previous response.
<u>ACTION- ECUSIM</u>	Delay <i>P2</i> , then transmit the 15765_11_ECU2_SID\$01_PID\$00 message, delay <i>P2</i> , then transmit the 15765_11_ECU1_SID\$01_NRC\$21 message.
<u>EVALUATION</u>	Pass if the messages were successfully transmitted.
<u>ACTION- DUT</u>	The DUT re-transmits the 15765_11_SID\$01_PID\$00 message.
<u>EVALUATION</u>	Pass if the message was transmitted $\geq$ 200 ms after the previous response.
<u>ACTION- ECUSIM</u>	Delay <i>P2</i> , then transmit the 15765_11_ECU2_SID\$01_PID\$00 message, delay <i>P2</i> , then transmit the 15765_11_ECU1_SID\$01_NRC\$21 message.
<u>EVALUATION</u>	Pass if the messages were successfully transmitted.
<u>ACTION- DUT</u>	The DUT re-transmits the 15765_11_SID\$01_PID\$00 message.
<u>EVALUATION</u>	Pass if the message was transmitted $\geq$ 200 ms after the previous response.
<u>ACTION- ECUSIM</u>	Delay <i>P2</i> , then transmit the 15765_11_ECU2_SID\$01_PID\$00 message, delay <i>P2</i> , then transmit the 15765_11_ECU1_SID\$01_NRC\$21 message.
<u>EVALUATION</u>	Pass if the messages were successfully transmitted.
<u>ACTION- DUT</u>	The DUT re-transmits the 15765_11_SID\$01_PID\$00 message.
<u>EVALUATION</u>	Pass if the message was transmitted $\geq$ 200 ms after the previous response.
<u>ACTION- ECUSIM</u>	Delay <i>P2</i> , then transmit the 15765_11_ECU2_SID\$01_PID\$00 message, delay <i>P2</i> , then transmit the 15765_11_ECU1_SID\$01_NRC\$21 message.

<u>EVALUATION</u>	Pass if the messages were successfully transmitted.
<u>ACTION- DUT</u>	The DUT re-transmits the 15765_11_SID\$01_PID\$00 message.
<u>EVALUATION</u>	Pass if the message was transmitted ≥ 200 ms after the previous response.
<u>ACTION- ECUSIM</u>	Delay <i>P2</i> , then transmit the 15765_11_ECU2_SID\$01_PID\$00 message, delay <i>P2</i> , then transmit the 15765_11_ECU1_SID\$01_PID\$00 message.
<u>EVALUATION</u>	Pass if the messages were successfully transmitted.
<u>ACTION- DUT</u>	The DUT stops transmitting the 15765_11_SID\$01_PID\$00 message.
<u>EVALUATION</u>	The DUT identifies the OBD II protocol as ISO 15765-4 with 2 ECUs.

Figure 36 - Test ISO 15765-4 protocol initialization with NRC=\$21 (11-bit, 500K)

8.3 ISO 14230-4 Tests

These protocol tests are specific to ISO 14230-4. Unless otherwise specified, all references to Electrical Connections, ECU Addresses, Messages, Message Timing, and pre-defined states will be as described in 5.4.3.13.

8.3.1 Verify Bit Times for 10400 Baud Communications

Test ID:	\$20201000
Purpose:	The purpose of this test is to verify that the bit times on the ISO 14230-4 network when the DUT is transmitting at 10400 baud meet the signal and communication specification set forth in ISO 14230-1.
Rationale:	THIS TEST WILL BE ADDED AT A FUTURE DATE.

Figure 37 - Verify ISO 14230-4 bit times for 10400 baud communications

8.3.2 Verify 5-Baud Initialization with Key Bytes \$8FE9 (2 ECUs)

Test ID:	\$20203000
Purpose:	The purpose of this test is to verify that the DUT can successfully perform a 5-baud OBD II initialization on the ISO 14230-4 network and communicate at 10400 baud when the Key Bytes \$E9 \$8F are returned.
Rationale:	This test will use a positive response from the first ECU with the Key Bytes \$E9 \$8F, then two ECUs will respond positively to the SID \$01 PID \$00 request.
Set Up:	The DUT shall be in the "ISO 14230-4 Connected State" as defined in 5.4.4.5 with the ISO 14230-4 network connected to the ECUSIM. The ECUSIM shall be in the "ISO 14230-4 Connected State" as defined in 5.4.4.5. An oscilloscope shall be connected to the ISO 14230-4 network to measure the timing of voltage transitions during the initialization process.
Procedure:	
<u>ACTION- DUT</u>	The DUT starts the ISO 14230-4 5-baud initialization sequence.
<u>EVALUATION</u>	Pass if the following events occurred in this order: Both K and L Lines at idle (logic '1') for the time specified in <i>W5</i>. Both K and L Lines transmit the byte \$33 at 5-bits per second $\pm 0.5\%$.
<u>ACTION- ECUSIM</u>	Using 10400 baud from now on, delay <i>W1</i> , transmit the byte \$55, delay <i>W2</i> , transmit \$E9, delay <i>W3</i> , transmit \$8F.
<u>EVALUATION</u>	Pass if \$70 is received in no less than <i>W4</i> <i>MIN</i> and no greater than <i>W4</i> <i>MAX</i> .
<u>ACTION- ECUSIM</u>	After the <i>W4</i> delay, transmit the byte \$CC.
<u>EVALUATION</u>	Pass if transmission is successful.
<u>ACTION- DUT</u>	The DUT issues the Service \$01 PID \$00 request.
<u>EVALUATION</u>	Pass if the message 14230_SID\$01_PID\$00 was transmitted (at 10400 baud) over the K Line with inter-byte times of at least <i>P4</i> <i>MIN</i> and no greater than <i>P4</i> <i>MAX</i> .
<u>ACTION- ECUSIM</u>	After the <i>P2</i> delay, transmit the message 14230_ECU1_SID\$01_PID\$00 , delay <i>P2</i> , then transmit the message 14230_ECU2_SID\$01_PID\$00 .
<u>EVALUATION</u>	Pass if transmission was successful and the DUT identifies the OBD II protocol as ISO 14230-4 with 2 ECUs.

Figure 38 - Verify ISO 14230-4 5-baud initialization with key bytes \$E9 \$8F and 2 ECUs

8.3.3 Verify 5-Baud Initialization with Key Bytes \$8F6B (2 ECUs)

Test ID:	\$20203001
Purpose:	The purpose of this test is to verify that the DUT can successfully perform a 5-baud OBD II initialization on the ISO 14230-4 network and communicate at 10400 baud when the Key Bytes \$6B \$8F are returned.
Rationale:	This test will use a positive response from the first ECU with the Key Bytes \$6B \$8F, then two ECUs will respond positively to the SID \$01 PID \$00 request.
Set Up:	The DUT shall be in the "ISO 14230-4 Connected State" as defined in 5.4.4.5 with the ISO 14230-4 network connected to the ECUSIM. The ECUSIM shall be in the "ISO 14230-4 Connected State" as defined in 5.4.4.5. An oscilloscope shall be connected to the ISO 14230-4 network to measure the timing of voltage transitions during the initialization process.
Procedure:	
<u>ACTION- DUT</u>	The DUT starts the ISO 14230-4 5-baud initialization sequence.
<u>EVALUATION</u>	Pass if the following events occurred in this order: Both K and L Lines at idle (logic '1') for the time specified in <i>W5</i>. Both K and L Lines transmit the byte \$33 at 5-bits per second $\pm 0.5\%$.
<u>ACTION- ECUSIM</u>	Using 10400 baud from now on, delay <i>W1</i> , transmit the byte \$55, delay <i>W2</i> , transmit \$6B, delay <i>W3</i> , transmit \$8F.
<u>EVALUATION</u>	Pass if \$70 is received in no less than <i>W4</i> <i>MIN</i> and no greater than <i>W4</i> <i>MAX</i> .
<u>ACTION- ECUSIM</u>	After the <i>W4</i> delay, transmit the byte \$CC.
<u>EVALUATION</u>	Pass if transmission is successful.
<u>ACTION- DUT</u>	The DUT issues the Service \$01 PID \$00 request.
<u>EVALUATION</u>	Pass if the message 14230_SID\$01_PID\$00 was transmitted (at 10400 baud) over the K Line with inter-byte times of at least <i>P4</i> <i>MIN</i> and no greater than <i>P4</i> <i>MAX</i> .
<u>ACTION- ECUSIM</u>	After the <i>P2</i> delay, transmit the message 14230_ECU1_SID\$01_PID\$00 , delay <i>P2</i> , then transmit the message 14230_ECU2_SID\$01_PID\$00 .
<u>EVALUATION</u>	Pass if transmission was successful and the DUT identifies the OBD II protocol as ISO 14230-4 with 2 ECUs.

Figure 39 - Verify ISO 14230-4 5-baud initialization with key bytes \$6B \$8F and 2 ECUs

8.3.4 Verify 5-Baud Initialization with Key Bytes \$8F6D (2 ECUs)

Test ID:	\$20203002
Purpose:	The purpose of this test is to verify that the DUT can successfully perform a 5-baud OBD II initialization on the ISO 14230-4 network and communicate at 10400 baud when the Key Bytes \$6D \$8F are returned.
Rationale:	This test will use a positive response from the first ECU with the Key Bytes \$6D \$8F, then two ECUs will respond positively to the SID \$01 PID \$00 request.
Set Up:	The DUT shall be in the "ISO 14230-4 Connected State" as defined in 5.4.4.5 with the ISO 14230-4 network connected to the ECUSIM. The ECUSIM shall be in the "ISO 14230-4 Connected State" as defined in 5.4.4.5. An oscilloscope shall be connected to the ISO 14230-4 network to measure the timing of voltage transitions during the initialization process.
Procedure:	
<u>ACTION- DUT</u>	The DUT starts the ISO 14230-4 5-baud initialization sequence.
<u>EVALUATION</u>	Pass if the following events occurred in this order: Both K and L Lines at idle (logic '1') for the time specified in <i>W5</i>. Both K and L Lines transmit the byte \$33 at 5-bits per second $\pm 0.5\%$.
<u>ACTION- ECUSIM</u>	Using 10400 baud from now on, delay <i>W1</i> , transmit the byte \$55, delay <i>W2</i> , transmit \$6D, delay <i>W3</i> , transmit \$8F.
<u>EVALUATION</u>	Pass if \$70 is received in no less than <i>W4</i> <i>MIN</i> and no greater than <i>W4</i> <i>MAX</i> .
<u>ACTION- ECUSIM</u>	After the <i>W4</i> delay, transmit the byte \$CC.
<u>EVALUATION</u>	Pass if transmission is successful.
<u>ACTION- DUT</u>	The DUT issues the Service \$01 PID \$00 request.
<u>EVALUATION</u>	Pass if the message 14230_SID\$01_PID\$00 was transmitted (at 10400 baud) over the K Line with inter-byte times of at least <i>P4</i> <i>MIN</i> and no greater than <i>P4</i> <i>MAX</i> .
<u>ACTION- ECUSIM</u>	After the <i>P2</i> delay, transmit the message 14230_ECU1_SID\$01_PID\$00 , delay <i>P2</i> , then transmit the message 14230_ECU2_SID\$01_PID\$00 .
<u>EVALUATION</u>	Pass if transmission was successful and the DUT identifies the OBD II protocol as ISO 14230-4 with 2 ECUs.

Figure 40 - Verify ISO 14230-4 5-baud initialization with key bytes \$6D \$8F and 2 ECUs

8.3.5 Verify 5-Baud Initialization with Key Bytes \$8FEF (2 ECUs)

Test ID:	\$20203003
Purpose:	The purpose of this test is to verify that the DUT can successfully perform a 5-baud OBD II initialization on the ISO 14230-4 network and communicate at 10400 baud when the Key Bytes \$EF \$8F are returned.
Rationale:	This test will use a positive response from the first ECU with the Key Bytes \$EF \$8F, then two ECUs will respond positively to the SID \$01 PID \$00 request.
Set Up:	The DUT shall be in the "ISO 14230-4 Connected State" as defined in 5.4.4.5 with the ISO 14230-4 network connected to the ECUSIM. The ECUSIM shall be in the "ISO 14230-4 Connected State" as defined in 5.4.4.5. An oscilloscope shall be connected to the ISO 14230-4 network to measure the timing of voltage transitions during the initialization process.
Procedure:	
<u>ACTION- DUT</u>	The DUT starts the ISO 14230-4 5-baud initialization sequence.
<u>EVALUATION</u>	Pass if the following events occurred in this order: Both K and L Lines at idle (logic '1') for the time specified in <i>W5</i>. Both K and L Lines transmit the byte \$33 at 5-bits per second $\pm 0.5\%$.
<u>ACTION- ECUSIM</u>	Using 10400 baud from now on, delay <i>W1</i> , transmit the byte \$55, delay <i>W2</i> , transmit \$EF, delay <i>W3</i> , transmit \$8F.
<u>EVALUATION</u>	Pass if \$70 is received in no less than <i>W4</i> <i>MIN</i> and no greater than <i>W4</i> <i>MAX</i> .
<u>ACTION- ECUSIM</u>	After the <i>W4</i> delay, transmit the byte \$CC.
<u>EVALUATION</u>	Pass if transmission is successful.
<u>ACTION- DUT</u>	The DUT issues the Service \$01 PID \$00 request.
<u>EVALUATION</u>	Pass if the message 14230_SID\$01_PID\$00 was transmitted (at 10400 baud) over the K Line with inter-byte times of at least <i>P4</i> <i>MIN</i> and no greater than <i>P4</i> <i>MAX</i> .
<u>ACTION- ECUSIM</u>	After the <i>P2</i> delay, transmit the message 14230_ECU1_SID\$01_PID\$00 , delay <i>P2</i> , then transmit the message 14230_ECU2_SID\$01_PID\$00 .
<u>EVALUATION</u>	Pass if transmission was successful and the DUT identifies the OBD II protocol as ISO 14230-4 with 2 ECUs.

Figure 41 - Verify ISO 14230-4 fast initialization with key bytes \$EF \$8F and 2 ECUs

8.3.6 Verify Fast Initialization with Key Bytes \$8FE9 (2 ECUs)

Test ID:	\$20203004
Purpose:	The purpose of this test is to verify that the DUT can successfully perform a fast OBD II initialization on the ISO 14230-4 network and communicate at 10400 baud when the Key Bytes \$E9 \$8F are returned.
Rationale:	This test will use a positive response from the first ECU with the Key Bytes \$E9 \$8F, then two ECUs will respond positively to the SID \$01 PID \$00 request.
Set Up:	The DUT shall be in the "ISO 14230-4 Connected State" as defined in 5.4.4.5 with the ISO 14230-4 network connected to the ECUSIM. The ECUSIM shall be in the "ISO 14230-4 Connected State" as defined in 5.4.4.5. An oscilloscope shall be connected to the ISO 14230-4 network to measure the timing of voltage transitions during the initialization process.
Procedure:	
<u>ACTION- DUT</u>	The DUT starts the ISO 14230-4 fast initialization sequence.
<u>EVALUATION</u>	Pass if the following events occurred in this order: The K Line was at logic '1' for at least <i>W5</i> before changing to logic '0' for <i>TiniL</i> then returning to a logic '1' for the remainder of <i>Twup</i>. The message 14230_START_COMM was transmitted.
<u>ACTION- ECUSIM</u>	Delay <i>P2</i> , then transmit the message 14230_ECU1_START_COMM_E98F .
<u>EVALUATION</u>	Pass if transmission is successful.
<u>ACTION- DUT</u>	The DUT issues the Service \$01 PID \$00 request.
<u>EVALUATION</u>	Pass if the message 14230_SID\$01_PID\$00 was transmitted over the K Line with inter-byte times of at least <i>P4_MIN</i> and no greater than <i>P4_MAX</i> .
<u>ACTION- ECUSIM</u>	After the <i>P2</i> delay, transmit the message 14230_ECU1_SID\$01_PID\$00 , delay <i>P2</i> , then transmit the message 14230_ECU2_SID\$01_PID\$00 .
<u>EVALUATION</u>	Pass if transmission was successful and the DUT identifies the OBD II protocol as 14230-4 with 2 ECUs.

Figure 42 - Verify ISO 14230-4 fast initialization with key bytes \$E9 \$8F and 2 ECUs

8.3.7 Verify Fast Initialization with Key Bytes \$8F6B (2 ECUs)

Test ID:	\$20203005
Purpose:	The purpose of this test is to verify that the DUT can successfully perform a fast OBD II initialization on the ISO 14230-4 network and communicate at 10400 baud when the Key Bytes \$6B \$8F are returned.
Rationale:	This test will use a positive response from the first ECU with the Key Bytes \$6B \$8F, then two ECUs will respond positively to the SID \$01 PID \$00 request.
Set Up:	The DUT shall be in the "ISO 14230-4 Connected State" as defined in 5.4.4.5 with the ISO 14230-4 network connected to the ECUSIM. The ECUSIM shall be in the "ISO 14230-4 Connected State" as defined in 5.4.4.5. An oscilloscope shall be connected to the ISO 14230-4 network to measure the timing of voltage transitions during the initialization process.
Procedure:	
<u>ACTION- DUT</u>	The DUT starts the ISO 14230-4 fast initialization sequence.
<u>EVALUATION</u>	Pass if the following events occurred in this order: The K Line was at logic '1' for at least <i>W5</i> before changing to logic '0' for <i>TiniL</i> then returning to a logic '1' for the remainder of <i>Twup</i>. The message 14230_START_COMM was transmitted.
<u>ACTION- ECUSIM</u>	Delay <i>P2</i> , then transmit the message 14230_ECU1_START_COMM_6B8F .
<u>EVALUATION</u>	Pass if transmission is successful.
<u>ACTION- DUT</u>	The DUT issues the Service \$01 PID \$00 request.
<u>EVALUATION</u>	Pass if the message 14230_SID\$01_PID\$00 was transmitted over the K Line with inter-byte times of at least <i>P4_MIN</i> and no greater than <i>P4_MAX</i> .
<u>ACTION- ECUSIM</u>	After the <i>P2</i> delay, transmit the message 14230_ECU1_SID\$01_PID\$00 , delay <i>P2</i> , then transmit the message 14230_ECU2_SID\$01_PID\$00 .
<u>EVALUATION</u>	Pass if transmission was successful and the DUT identifies the OBD II protocol as 14230-4 with 2 ECUs.

Figure 43 - Verify ISO 14230-4 fast initialization with key bytes \$6B \$8F and 2 ECUs

8.3.8 Verify Fast Initialization with Key Bytes \$8F6D (2 ECUs)

Test ID:	\$20203006
Purpose:	The purpose of this test is to verify that the DUT can successfully perform a fast OBD II initialization on the ISO 14230-4 network and communicate at 10400 baud when the Key Bytes \$6D \$8F are returned.
Rationale:	This test will use a positive response from the first ECU with the Key Bytes \$6D \$8F, then two ECUs will respond positively to the SID \$01 PID \$00 request.
Set Up:	The DUT shall be in the "ISO 14230-4 Connected State" as defined in 5.4.4.5 with the ISO 14230-4 network connected to the ECUSIM. The ECUSIM shall be in the "ISO 14230-4 Connected State" as defined in 5.4.4.5. An oscilloscope shall be connected to the ISO 14230-4 network to measure the timing of voltage transitions during the initialization process.
Procedure:	
<u>ACTION- DUT</u>	The DUT starts the ISO 14230-4 fast initialization sequence.
<u>EVALUATION</u>	Pass if the following events occurred in this order: The K Line was at logic '1' for at least <i>W5</i> before changing to logic '0' for <i>TiniL</i> then returning to a logic '1' for the remainder of <i>Twup</i>. The message 14230_START_COMM was transmitted.
<u>ACTION- ECUSIM</u>	Delay <i>P2</i> , then transmit the message 14230_ECU1_START_COMM_6D8F .
<u>EVALUATION</u>	Pass if transmission is successful.
<u>ACTION- DUT</u>	The DUT issues the Service \$01 PID \$00 request.
<u>EVALUATION</u>	Pass if the message 14230_SID\$01_PID\$00 was transmitted over the K Line with inter-byte times of at least <i>P4_MIN</i> and no greater than <i>P4_MAX</i> .
<u>ACTION- ECUSIM</u>	After the <i>P2</i> delay, transmit the message 14230_ECU1_SID\$01_PID\$00 , delay <i>P2</i> , then transmit the message 14230_ECU2_SID\$01_PID\$00 .
<u>EVALUATION</u>	Pass if transmission was successful and the DUT identifies the OBD II protocol as 14230-4 with 2 ECUs.

Figure 44 - Verify ISO 14230-4 fast initialization with key bytes \$6D \$8F and 2 ECUs

8.3.9 Verify Fast Initialization with Key Bytes \$8FEF (2 ECUs)

Test ID:	\$20203007
Purpose:	The purpose of this test is to verify that the DUT can successfully perform a fast OBD II initialization on the ISO 14230-4 network and communicate at 10400 baud when the Key Bytes \$EF \$8F are returned.
Rationale:	This test will use a positive response from the first ECU with the Key Bytes \$EF \$8F, then two ECUs will respond positively to the SID \$01 PID \$00 request.
Set Up:	The DUT shall be in the "ISO 14230-4 Connected State" as defined in 5.4.4.5 with the ISO 14230-4 network connected to the ECUSIM. The ECUSIM shall be in the "ISO 14230-4 Connected State" as defined in 5.4.4.5. An oscilloscope shall be connected to the ISO 14230-4 network to measure the timing of voltage transitions during the initialization process.
Procedure:	
<u>ACTION- DUT</u>	The DUT starts the ISO 14230-4 fast initialization sequence.
<u>EVALUATION</u>	Pass if the following events occurred in this order: The K Line was at logic '1' for at least <i>W5</i> before changing to logic '0' for <i>TiniL</i> then returning to a logic '1' for the remainder of <i>Twup</i>. The message 14230_START_COMM was transmitted.
<u>ACTION- ECUSIM</u>	Delay <i>P2</i> , then transmit the message 14230_ECU1_START_COMM_EF8F .
<u>EVALUATION</u>	Pass if transmission is successful.
<u>ACTION- DUT</u>	The DUT issues the Service \$01 PID \$00 request.
<u>EVALUATION</u>	Pass if the message 14230_SID\$01_PID\$00 was transmitted over the K Line with inter-byte times of at least <i>P4_MIN</i> and no greater than <i>P4_MAX</i> .
<u>ACTION- ECUSIM</u>	After the <i>P2</i> delay, transmit the message 14230_ECU1_SID\$01_PID\$00 , delay <i>P2</i> , then transmit the message 14230_ECU2_SID\$01_PID\$00 .
<u>EVALUATION</u>	Pass if transmission was successful and the DUT identifies the OBD II protocol as 14230-4 with 2 ECUs.

Figure 45 - Verify ISO 14230-4 Fast initialization with Key Bytes \$EF \$8F and 2 ECUs

8.3.10 Verify Fast Initialization with Key Bytes \$8FEF (8 ECUs)

Test ID:	\$20203008
Purpose:	The purpose of this test is to verify that the DUT can successfully perform a fast OBD II initialization on the ISO 14230-4 network and communicate at 10400 baud when the Key Bytes \$EF \$8F are returned.
Rationale:	This test will use a positive response from the first ECU with the Key Bytes \$EF \$8F, then 8 ECUs will respond positively to the SID \$01 PID \$00 request with ECU3 through ECU8 indicating that no SID \$01 PIDs are supported.
Set Up:	The DUT shall be in the "ISO 14230-4 Connected State" as defined in 5.4.4.5 with the ISO 14230-4 network connected to the ECUSIM. The ECUSIM shall be in the "ISO 14230-4 Connected State" as defined in 5.4.4.5. An oscilloscope shall be connected to the ISO 14230-4 network to measure the timing of voltage transitions during the initialization process.
Procedure:	
<u>ACTION- DUT</u>	The DUT starts the ISO 14230-4 fast initialization sequence.
<u>EVALUATION</u>	Pass if the following events occurred in this order: The K Line was at logic '1' for at least <i>W5</i> before changing to logic '0' for <i>TiniL</i> then returning to a logic '1' for the remainder of <i>Twup</i>. The message 14230_START_COMM was transmitted.
<u>ACTION- ECUSIM</u>	Delay <i>P2</i> , then transmit the message 14230_ECU1_START_COMM_EF8F .
<u>EVALUATION</u>	Pass if transmission is successful.
<u>ACTION- DUT</u>	The DUT issues the Service \$01 PID \$00 request.
<u>EVALUATION</u>	Pass if the message 14230_SID\$01_PID\$00 was transmitted over the K Line with inter-byte times of at least <i>P4_MIN</i> and no greater than <i>P4_MAX</i> .
<u>ACTION- ECUSIM</u>	Delay <i>P2</i>, then transmit the message 14230_ECU1_SID\$01_PID\$00. Delay <i>P2</i>, then transmit the message 14230_ECU2_SID\$01_PID\$00. Delay <i>P2</i>, then transmit the message 14230_ECU3_SID\$01_PID\$00. Delay <i>P2</i>, then transmit the message 14230_ECU4_SID\$01_PID\$00. Delay <i>P2</i>, then transmit the message 14230_ECU5_SID\$01_PID\$00. Delay <i>P2</i>, then transmit the message 14230_ECU6_SID\$01_PID\$00. Delay <i>P2</i>, then transmit the message 14230_ECU7_SID\$01_PID\$00. Delay <i>P2</i>, then transmit the message 14230_ECU8_SID\$01_PID\$00.
<u>EVALUATION</u>	Pass if transmission was successful and the DUT identifies the OBD II protocol as 14230-4 with 8 ECUs.

Figure 46 - Verify ISO 14230-4 fast initialization with key bytes \$EF \$8F and 8 ECUS

8.3.11 Verify Fast Initialization with No OBD II Key Bytes (1 ECU)

Test ID:	\$20203009
Purpose:	The purpose of this test is to verify that the DUT will accept specific non-OBD II key bytes as as valid on the ISO 14230-4 protocol. (This anomaly is detailed in SAE J1699-4.)
Rationale:	This test will use non-OBD II Key Bytes.
Set Up:	The DUT shall be in the “ISO14230-4 Connected State” as defined in 5.4.4.5 with the ISO 14230-4 network connected to the ECUSIM. The ECUSIM shall be in the “ISO14230-4 Connected State” as defined in 5.4.4.5. An oscilloscope shall be connected to the ISO 14230-4 network to measure the timing of voltage transitions during the initialization process.
Procedure:	
<u>ACTION- DUT</u>	The DUT starts the ISO 14230-4 Fast Initialization sequence.
<u>EVALUATION</u>	Pass if the following events occurred in this order: The K Line was at logic ‘1’ for at least <i>W5</i> before changing to logic ‘0’ for <i>TiniL</i> then returning to a logic ‘1’ for the remainder of <i>Twup</i>. The message 14230_START_COMM was transmitted.
<u>ACTION- ECUSIM</u>	Delay <i>P2</i> , then transmit the message 14230_ECU1_START_COMM_NO_KB .
<u>EVALUATION</u>	Pass if transmission is successful.
<u>ACTION- DUT</u>	The DUT issues the Service \$01 PID \$00 request.
<u>EVALUATION</u>	Pass if the message 14230_SID\$01_PID\$00 was transmitted over the K Line with inter-byte times of at least <i>P4_MIN</i> and no greater than <i>P4_MAX</i> .
<u>ACTION- ECUSIM</u>	Delay <i>P2</i> , then transmit the message 14230_ECU18_SID\$01_PID\$00 .
<u>EVALUATION</u>	Pass if transmission was successful and the DUT identifies the OBD II protocol as 14230-4 with 1 ECU.

Figure 47 - Test ISO 14230-4 fast initialization with no OBD II key bytes and 1 ECU

8.3.12 Verify Fast Initialization with Non-OBD II Key Bytes \$0000 (1 ECU)

Test ID:	\$20203009
Purpose:	The purpose of this test is to verify that the DUT will accept specific non-OBD II key bytes as valid on the ISO 14230-4 protocol. (This anomaly is detailed in SAE J1699-4.)
Rationale:	This test will use non-OBD II Key Bytes.
Set Up:	The DUT shall be in the "ISO14230-4 Connected State" as defined in 5.4.4.5 with the ISO 14230-4 network connected to the ECUSIM. The ECUSIM shall be in the "ISO14230-4 Connected State" as defined in 5.4.4.5. An oscilloscope shall be connected to the ISO 14230-4 network to measure the timing of voltage transitions during the initialization process.
Procedure:	
<u>ACTION- DUT</u>	The DUT starts the ISO 14230-4 Fast Initialization sequence.
<u>EVALUATION</u>	Pass if the following events occurred in this order: The K Line was at logic '1' for at least <i>W5</i> before changing to logic '0' for <i>TiniL</i> then returning to a logic '1' for the remainder of <i>Twup</i>. The message 14230_START_COMM was transmitted.
<u>ACTION- ECUSIM</u>	Delay <i>P2</i> , then transmit the message 14230_ECU1_START_COMM_0000 .
<u>EVALUATION</u>	Pass if transmission is successful.
<u>ACTION- DUT</u>	The DUT issues the Service \$01 PID \$00 request.
<u>EVALUATION</u>	Pass if the message 14230_SID\$01_PID\$00 was transmitted over the K Line with inter-byte times of at least <i>P4_MIN</i> and no greater than <i>P4_MAX</i> .
<u>ACTION- ECUSIM</u>	Delay <i>P2</i> , then transmit the message 14230_ECU18_SID\$01_PID\$00 .
<u>EVALUATION</u>	Pass if transmission was successful and the DUT identifies the OBD II protocol as 14230-4 with 1 ECU.

Figure 48 - Test ISO 14230-4 fast initialization with non-OBD II key bytes \$00 \$00 and 1 ECU

8.4 ISO 9141-2 Tests

These protocol tests are specific to ISO 9141-2. Unless otherwise specified, all references to Electrical Connections, ECU Addresses, Messages, Message Timing, and pre-defined states will be as described in 5.4.4.7.

8.4.1 Verify Bit Times for 10400 Baud Communications

Test ID:	\$20301000
Purpose:	The purpose of this test is to verify that the bit times on the ISO 9141-2 network when the DUT is transmitting at 10400 baud meet the signal and communication specification set forth in ISO 9141-2.
Rationale:	THIS TEST WILL BE ADDED AT A FUTURE DATE.

Figure 49 - Verify ISO 9141-2 bit times for 10400 baud communications

8.4.2 Verify 5-Baud Initialization with Key Bytes \$0808 (2 ECUs)

Test ID:	\$20303000
Purpose:	The purpose of this test is to verify that the DUT can successfully perform a 5-baud OBD II initialization on the ISO 9141-2 network and communicate at 10400 baud when the Key Bytes \$08 \$08 are returned.
Rationale:	This test will use a positive response from the first ECU with the Key Bytes \$08 \$08, then two ECUs will respond positively to the SID \$01 PID \$00 request.
Set Up:	The DUT shall be in the “ISO9141-2 Connected State” as defined in 5.4.5.5 with the ISO 9141-2 network connected to the ECUSIM. The ECUSIM shall be in the “ISO9141-2 Connected State” as defined in 5.4.5.5. An oscilloscope shall be connected to the ISO 9141-2 network to measure the timing of voltage transitions during the initialization process.
Procedure:	
<u>ACTION- DUT</u>	The DUT starts the ISO 9141-2 5-baud initialization sequence.
<u>EVALUATION</u>	Pass if the following events occurred in this order: Verify that both K and L Lines at idle (logic ‘1’) for the time specified in W5. Verify that both K and L Lines transmit the byte \$33 at 5-bits per second $\pm 0.5\%$.
<u>ACTION- ECUSIM</u>	Using 10400 baud from now on, delay W1, transmit the byte \$55, delay W2, transmit \$08, delay W3, transmit \$08.
<u>EVALUATION</u>	Pass if \$F7 is received in no less than W4 MIN and no greater than W4 MAX.
<u>ACTION- ECUSIM</u>	After the W4 delay, transmit the byte \$CC.
<u>EVALUATION</u>	Pass if transmission is successful.
<u>ACTION- DUT</u>	The DUT issues the Service \$01 PID \$00 request.
<u>EVALUATION</u>	Pass if the message 9141_SID\$01_PID\$00 was transmitted (at 10400 baud) over the K Line with inter-byte times of at least P4 MIN and no greater than P4 MAX.
<u>ACTION- ECUSIM</u>	After the P2 delay, transmit the message 9141_ECU1_SID\$01_PID\$00 , delay P2, then transmit the message 9141_ECU2_SID\$01_PID\$00 .
<u>EVALUATION</u>	Pass if transmission was successful and the DUT identifies the OBD II protocol as ISO 9141-2 with 2 ECUs.

Figure 50 - Verify ISO 9141-2 5-baud initialization with key bytes \$08 \$08 and 2 ECUs

8.4.3 Verify 5-Baud Initialization with Key Bytes \$0808 (8 ECUs)

Test ID:	\$20303001
Purpose:	The purpose of this test is to verify that the DUT can successfully perform a 5-baud OBD II initialization on the ISO 9141-2 network and communicate at 10400 baud when the Key Bytes \$08 \$08 are returned.
Rationale:	This test will use a positive response from the first ECU with the Key Bytes \$08 \$08, then 8 ECUs will respond positively to the SID \$01 PID \$00 request with ECU3 through ECU8 indicating that no SID \$01 PIDs are supported.
Set Up:	The DUT shall be in the “ISO9141-2 Connected State” as defined in 5.4.5.5 with the ISO 9141-2 network connected to the ECUSIM. The ECUSIM shall be in the “ISO9141-2 Connected State” as defined in 5.4.5.5. An oscilloscope shall be connected to the ISO 9141-2 network to measure the timing of voltage transitions during the initialization process.
Procedure:	
<u>ACTION- DUT</u>	The DUT starts the ISO 9141-2 5-baud initialization sequence.
<u>EVALUATION</u>	Pass if the following events occurred in this order: Verify that both K and L Lines at idle (logic ‘1’) for the time specified in <i>W5</i>. Verify that both K and L Lines transmit the byte \$33 at 5-bits per second $\pm 0.5\%$.
<u>ACTION- ECUSIM</u>	Using 10400 baud from now on, delay <i>W1</i> , transmit the byte \$55, delay <i>W2</i> , transmit \$08, delay <i>W3</i> , transmit \$08.
<u>EVALUATION</u>	Pass if \$F7 is received in no less than <i>W4</i> <i>MIN</i> and no greater than <i>W4</i> <i>MAX</i> .
<u>ACTION- ECUSIM</u>	After the <i>W4</i> delay, transmit the byte \$CC.
<u>EVALUATION</u>	Pass if transmission is successful.
<u>ACTION- DUT</u>	The DUT issues the Service \$01 PID \$00 request.
<u>EVALUATION</u>	Pass if the message 9141_SID\$01_PID\$00 was transmitted (at 10400 baud) over the K Line with inter-byte times of at least <i>P4</i> <i>MIN</i> and no greater than <i>P4</i> <i>MAX</i> .
<u>ACTION- ECUSIM</u>	Delay <i>P2</i>, then transmit the message 9141_ECU1_SID\$01_PID\$00. Delay <i>P2</i>, then transmit the message 9141_ECU2_SID\$01_PID\$00. Delay <i>P2</i>, then transmit the message 9141_ECU3_SID\$01_PID\$00. Delay <i>P2</i>, then transmit the message 9141_ECU4_SID\$01_PID\$00. Delay <i>P2</i>, then transmit the message 9141_ECU5_SID\$01_PID\$00. Delay <i>P2</i>, then transmit the message 9141_ECU6_SID\$01_PID\$00. Delay <i>P2</i>, then transmit the message 9141_ECU7_SID\$01_PID\$00. Delay <i>P2</i>, then transmit the message 9141_ECU8_SID\$01_PID\$00.
<u>EVALUATION</u>	Pass if transmission was successful and the DUT identifies the OBD II protocol as ISO 9141-2 with 8 ECUs.

Figure 51 - Verify ISO 9141-2 5-baud initialization with key bytes \$08 \$08 and 8 ECUS

8.4.4 Verify 5-Baud Initialization with Key Bytes \$94 \$94 (2 ECUs)

Test ID:	\$20303002
Purpose:	The purpose of this test is to verify that the DUT can successfully perform a 5-baud OBD II initialization on the ISO 9141-2 network and communicate at 10400 baud when the Key Bytes \$94 \$94 are returned.
Rationale:	This test will use a positive response from the first ECU with the Key Bytes \$94 \$94, then two ECUs will respond positively to the SID \$01 PID \$00 request.
Set Up:	The DUT shall be in the “ISO9141-2 Connected State” as defined in 5.4.5.5 with the ISO 9141-2 network connected to the ECUSIM. The ECUSIM shall be in the “ISO9141-2 Connected State” as defined in 5.4.5.5. An oscilloscope shall be connected to the ISO 9141-2 network to measure the timing of voltage transitions during the initialization process.
Procedure:	
<u>ACTION- DUT</u>	The DUT starts the ISO 9141-2 5-baud initialization sequence.
<u>EVALUATION</u>	Pass if the following events occurred in this order: Verify that both K and L Lines at idle (logic ‘1’) for the time specified in W5. Verify that both K and L Lines transmit the byte \$33 at 5-bits per second $\pm 0.5\%$.
<u>ACTION- ECUSIM</u>	Using 10400 baud from now on, delay W1, transmit the byte \$55, delay W2, transmit \$94, delay W3, transmit \$94.
<u>EVALUATION</u>	Pass if \$6B is received in no less than W4 MIN and no greater than W4 MAX.
<u>ACTION- ECUSIM</u>	After the W4 delay, transmit the byte \$CC.
<u>EVALUATION</u>	Pass if transmission is successful.
<u>ACTION- DUT</u>	The DUT issues the Service \$01 PID \$00 request.
<u>EVALUATION</u>	Pass if the message 9141_SID\$01_PID\$00 was transmitted (at 10400 baud) over the K Line with inter-byte times of at least P4 MIN and no greater than P4 MAX.
<u>ACTION- ECUSIM</u>	After the P2 delay, transmit the message 9141_ECU1_SID\$01_PID\$00 , delay P2, then transmit the message 9141_ECU2_SID\$01_PID\$00 .
<u>EVALUATION</u>	Pass if transmission was successful and the DUT identifies the OBD II protocol as ISO 9141-2 with 2 ECUs.

Figure 52 - Verify ISO 9141-2 5-baud initialization with key bytes \$94 \$94 and 2 ECUs

8.4.5 Verify Second Attempt at 5-Baud Initialization with Key Bytes \$9494 (2 ECUs)

Test ID:	\$20303003
Purpose:	The purpose of this test is to verify that the DUT can successfully perform a 5-baud OBD II initialization on the ISO 9141-2 network and communicate at 10400 baud when the Key Bytes \$94 \$94 are returned after receiving no response to the first attempt at 5-baud initialization.
Rationale:	This test will have the no response to the first attempt to initialize, but the second attempt will use a positive response from the first ECU with the Key Bytes \$94 \$94, then two ECUs will respond positively to the SID \$01 PID \$00 request.
Set Up:	The DUT shall be in the “ISO9141-2 Connected State” as defined in 5.4.5.5 with the ISO 9141-2 network connected to the ECUSIM. The ECUSIM shall be in the “ISO9141-2 Connected State” as defined in 5.4.5.5. An oscilloscope shall be connected to the ISO 9141-2 network to measure the timing of voltage transitions during the initialization process.
Procedure:	
<u>ACTION- DUT</u>	The DUT starts the ISO 9141-2 5-baud initialization sequence.
<u>EVALUATION</u>	Pass if the following events occurred in this order: Verify that both K and L Lines at idle (logic ‘1’) for the time specified in W5. Verify that both K and L Lines transmit the byte \$33 at 5-bits per second $\pm 0.5\%$.
<u>ACTION- ECUSIM</u>	The ECUSIM shall take no action in response to the first attempt at initialization. The ECUSIM shall wait for the second attempt at initialization.
<u>EVALUATION</u>	Pass if the following events occurred in this order: Verify that both K and L Lines at idle (logic ‘1’) for the time specified in W5. Verify that both K and L Lines transmit the byte \$33 at 5-bits per second $\pm 0.5\%$.
<u>ACTION- ECUSIM</u>	Using 10400 baud from now on, delay W1, transmit the byte \$55, delay W2, transmit \$94, delay W3, transmit \$94.
<u>EVALUATION</u>	Pass if \$6B is received in no less than W4 MIN and no greater than W4 MAX.
<u>ACTION- ECUSIM</u>	After the W4 delay, transmit the byte \$CC.
<u>EVALUATION</u>	Pass if transmission is successful.
<u>ACTION- DUT</u>	The DUT issues the Service \$01 PID \$00 request.
<u>EVALUATION</u>	Pass if the message 9141_SID\$01_PID\$00 was transmitted (at 10400 baud) over the K Line with inter-byte times of at least P4 MIN and no greater than P4 MAX.
<u>ACTION- ECUSIM</u>	After the P2 delay, transmit the message 9141_ECU1_SID\$01_PID\$00 , delay P2, then transmit the message 9141_ECU2_SID\$01_PID\$00 .
<u>EVALUATION</u>	Pass if transmission was successful and the DUT identifies the OBD II protocol as ISO 9141-2 with 2 ECUs.

Figure 53 - Verify ISO 9141-2 second attempt at 5-baud initialization with key bytes \$94 \$94 and 2 ECUs

8.4.6 Verify 5-Baud Initialization when SID \$01 PID \$00 First Response is Corrupted (2 ECUs)

Test ID:	\$20303004
Purpose:	The purpose of this test is to verify that after the 5-baud initialization, the DUT will re-transmit a request when the first response is corrupted (and there are no subsequent responses) to the SID \$01 PID \$00 request.
Rationale:	This test will have a successful 5-baud initialization, but the first (and only) response to SID \$01 PID \$00 will be corrupted.
Set Up:	The DUT shall be in the “ISO9141-2 Connected State” as defined in 5.4.5.5 with the ISO 9141-2 network connected to the ECUSIM. The ECUSIM shall be in the “ISO9141-2 Connected State” as defined in 5.4.5.5. An oscilloscope shall be connected to the ISO 9141-2 network to measure the timing of voltage transitions during the initialization process.
Procedure:	
<u>ACTION- DUT</u>	The DUT starts the ISO 9141-2 5-baud initialization sequence.
<u>EVALUATION</u>	Pass if the following events occurred in this order: Verify that both K and L Lines at idle (logic ‘1’) for the time specified in W5. Verify that both K and L Lines transmit the byte \$33 at 5-bits per second $\pm 0.5\%$.
<u>ACTION- ECUSIM</u>	Using 10400 baud from now on, delay W1, transmit the byte \$55, delay W2, transmit \$94, delay W3, transmit \$94.
<u>EVALUATION</u>	Pass if \$6B is received in no less than W4 MIN and no greater than W4 MAX.
<u>ACTION- ECUSIM</u>	After the W4 delay, transmit the byte \$CC.
<u>EVALUATION</u>	Pass if transmission is successful.
<u>ACTION- DUT</u>	The DUT issues the Service \$01 PID \$00 request.
<u>EVALUATION</u>	Pass if the message 9141_SID\$01_PID\$00 was transmitted (at 10400 baud) over the K Line with inter-byte times of at least P4 MIN and no greater than P4 MAX.
<u>ACTION- ECUSIM</u>	After the P2 delay, transmit the message 9141_ECU1_SID\$01_PID\$00_BAD .
<u>EVALUATION</u>	Pass if transmission was successful.
<u>ACTION- DUT</u>	Without user intervention, the DUT must redo the ISO 9141-2 5-baud initialization sequence.
<u>EVALUATION</u>	Pass if the following events occurred in this order: Verify that both K and L Lines at idle (logic ‘1’) for the time specified in W5. Verify that both K and L Lines transmit the byte \$33 at 5-bits per second $\pm 0.5\%$.
<u>ACTION- ECUSIM</u>	Using 10400 baud from now on, delay W1, transmit the byte \$55, delay W2, transmit \$94, delay W3, transmit \$94.
<u>EVALUATION</u>	Pass if \$6B is received in no less than W4 MIN and no greater than W4 MAX.
<u>ACTION- ECUSIM</u>	After the W4 delay, transmit the byte \$CC.
<u>EVALUATION</u>	Pass if transmission is successful.

<u>ACTION- DUT</u>	The DUT issues the Service \$01 PID \$00 request.
<u>EVALUATION</u>	Pass if the message 9141_SID\$01_PID\$00 was transmitted (at 10400 baud) over the K Line with inter-byte times of at least <i>P4_MIN</i> and no greater than <i>P4_MAX</i> .
<u>ACTION- ECUSIM</u>	After the <i>P2</i> delay, transmit the message 9141_ECU1_SID\$01_PID\$00 , delay <i>P2</i> , then transmit the message 9141_ECU2_SID\$01_PID\$00 .
<u>EVALUATION</u>	Pass if transmission was successful and the DUT identifies the OBD II protocol as ISO 9141-2 with 2 ECUs.

Figure 54 - Verify ISO 9141-2 request re-transmission when SID \$01 PID \$00 first response is corrupted

8.5 SAE J1850 VPW Tests

These protocol tests are specific to SAE J1850 VPW. Unless otherwise specified, all references to Electrical Connections, ECU Addresses, Messages, Message Timing, and pre-defined states will be as described in 5.4.5.7.

8.5.1 Verify Protocol Initialization (2 ECUs)

Test ID:	\$20403000
Purpose:	The purpose of this test is to verify that the DUT can successfully perform an OBD II initialization on the SAE J1850 VPW network.
Rationale:	This test will use positive responses from two different ECUs.
Set Up:	The DUT shall be in the "SAE J1850 VPW Connected State" as defined in 5.4.6.5 with the SAE J1850 VPW network connected to the ECUSIM. The ECUSIM shall be in the "SAE J1850 VPW Connected State" as defined in 5.4.6.5.
Procedure:	
<u>ACTION- DUT</u>	Initiate the OBD II protocol scan.
<u>EVALUATION</u>	Pass if the 1850VPW_SID\$01_PID\$00 message was transmitted.
<u>ACTION- ECUSIM</u>	After the <i>P2</i> delay, transmit the message 1850VPW_ECU1_SID\$01_PID\$00 , delay <i>P2</i> , then transmit the message 1850VPW_ECU2_SID\$01_PID\$00 .
<u>EVALUATION</u>	Pass if transmission is successful and the DUT identifies the OBD II protocol as SAE J1850 with 2 ECUs.

Figure 55 - Verify SAE J1850 VPW protocol initialization

8.5.2 Verify Protocol Initialization (8 ECUs)

Test ID:	\$20403001
Purpose:	The purpose of this test is to verify that the DUT can successfully perform an OBD II initialization on the SAE J1850 VPW network.
Rationale:	This test will use positive responses from eight different ECUs with ECU3 through ECU8 indicating that no SID \$01 PIDs are supported.
Set Up:	The DUT shall be in the “SAE J1850 VPW Connected State” as defined in 5.4.6.5 with the SAE J1850 VPW network connected to the ECUSIM. The ECUSIM shall be in the “SAE J1850 VPW Connected State” as defined in 5.4.6.5.
Procedure:	
<u>ACTION- DUT</u>	Initiate the OBD II protocol scan.
<u>EVALUATION</u>	Pass if the 1850VPW_SID\$01_PID\$00 message was transmitted.
<u>ACTION- ECUSIM</u>	Delay <i>P2</i> , then transmit the message 1850VPW_ECU1_SID\$01_PID\$00 . Delay <i>P2</i> , then transmit the message 1850VPW_ECU2_SID\$01_PID\$00 . Delay <i>P2</i> , then transmit the message 1850VPW_ECU3_SID\$01_PID\$00 . Delay <i>P2</i> , then transmit the message 1850VPW_ECU4_SID\$01_PID\$00 . Delay <i>P2</i> , then transmit the message 1850VPW_ECU5_SID\$01_PID\$00 . Delay <i>P2</i> , then transmit the message 1850VPW_ECU6_SID\$01_PID\$00 . Delay <i>P2</i> , then transmit the message 1850VPW_ECU7_SID\$01_PID\$00 . Delay <i>P2</i> , then transmit the message 1850VPW_ECU8_SID\$01_PID\$00 .
<u>EVALUATION</u>	Pass if transmission is successful and the DUT identifies the OBD II protocol as SAE J1850 with 8 ECUs.

Figure 56 - Verify SAE J1850 VPW protocol initialization with 8 ECUs

8.6 SAE J1850 PWM Tests

These protocol tests are specific to SAE J1850 PWM. Unless otherwise specified, all references to Electrical Connections, ECU Addresses, Messages, Message Timing, and pre-defined states will be as described in 5.4.6.7.

8.6.1 Verify Protocol Initialization (2 ECUs)

Test ID:	\$20503000
Purpose:	The purpose of this test is to verify that the DUT can successfully perform an OBD II initialization on the SAE J1850 PWM network.
Rationale:	This test will use positive responses from two different ECUs.
Set Up:	The DUT shall be in the “SAE J1850 PWM Connected State” as defined in 5.4.6.5 with the SAE J1850 PWM network connected to the ECUSIM. The ECUSIM shall be in the “SAE J1850 PWM Connected State” as defined in 5.4.6.5.
Procedure:	
<u>ACTION- DUT</u>	Initiate the OBD II protocol scan.
<u>EVALUATION</u>	Pass if the 1850PWM_SID\$01_PID\$00 message was transmitted.
<u>ACTION- ECUSIM</u>	After the <i>P2</i> delay, transmit the message 1850PWM_ECU1_SID\$01_PID\$00 , delay <i>P2</i> , then transmit the message 1850PWM_ECU2_SID\$01_PID\$00 .
<u>EVALUATION</u>	Pass if transmission is successful and the DUT identifies the OBD II protocol as SAE J1850 with 2 ECUs.

Figure 57 - Verify SAE J1850 PWM protocol initialization

8.6.2 Verify Protocol Initialization (8 ECUs)

Test ID:	\$20503001
Purpose:	The purpose of this test is to verify that the DUT can successfully perform an OBD II initialization on the SAE J1850 PWM network.
Rationale:	This test will use positive responses from eight different ECUs with ECU3 through ECU8 indicating that no SID \$01 PIDs are supported.
Set Up:	The DUT shall be in the “SAE J1850 PWM Connected State” as defined in 5.4.6.5 with the SAE J1850 PWM network connected to the ECUSIM. The ECUSIM shall be in the “SAE J1850 PWM Connected State” as defined in 5.4.6.5.
Procedure:	
<u>ACTION- DUT</u>	Initiate the OBD II protocol scan.
<u>EVALUATION</u>	Pass if the 1850PWM_SID\$01_PID\$00 message was transmitted.
<u>ACTION- ECUSIM</u>	Delay <i>P2</i> , then transmit the message 1850PWM_ECU1_SID\$01_PID\$00 . Delay <i>P2</i> , then transmit the message 1850PWM_ECU2_SID\$01_PID\$00 . Delay <i>P2</i> , then transmit the message 1850PWM_ECU3_SID\$01_PID\$00 . Delay <i>P2</i> , then transmit the message 1850PWM_ECU4_SID\$01_PID\$00 . Delay <i>P2</i> , then transmit the message 1850PWM_ECU5_SID\$01_PID\$00 . Delay <i>P2</i> , then transmit the message 1850PWM_ECU6_SID\$01_PID\$00 . Delay <i>P2</i> , then transmit the message 1850PWM_ECU7_SID\$01_PID\$00 . Delay <i>P2</i> , then transmit the message 1850PWM_ECU8_SID\$01_PID\$00 .
<u>EVALUATION</u>	Pass if transmission is successful and the DUT identifies the OBD II protocol as SAE J1850 with 8 ECUs.

Figure 58 - Verify SAE J1850 PWM protocol initialization with 8 ECUs

9. NETWORK EVALUATION

This section details test cases that will verify the network attributes (such as, message format, responses to incorrect/invalid messages, etc.) of the DUT.

9.1 General Tests

These are general network tests, which are not specific to any OBD II protocol.

9.2 ISO 15765-4 Tests

These network tests are specific to ISO 15765-4. Unless otherwise specified, all references to Electrical Connections, ECU Addresses, Messages, Message Timing, and pre-defined states will be as described in 5.4.3.

9.2.1 Verify a SID \$01 PID Supported PID Requests (11-bit, 500K; 1 ECU)

Test ID:	\$30101000
Purpose:	The purpose of this test is to verify that the DUT can correctly request a SID \$01 PID Supported PIDs.
Rationale:	This test will use positive responses from a single different ECU.
Set Up:	The DUT and ECUSIM shall be in the “ISO 15765 (11-bit, 500K, 2 ECUs) Initialized State”, which is detailed in 5.4.3.9.
Procedure:	
<u>ACTION- DUT</u>	Initiate the request for SID \$01 PID Supported PIDs.
<u>EVALUATION</u>	Pass if the 15765_11_SID\$01_PID\$00 message was transmitted.
<u>ACTION- ECUSIM</u>	After the <i>P2_MIN</i> delay, transmit the message 15765_11_ECU1_SID\$01_PID\$00_20 .
<u>EVALUATION</u>	Pass if transmission is successful and the DUT transmits the message 15765_11_SID\$01_PID\$20 .
<u>ACTION- ECUSIM</u>	After the <i>P2_MIN</i> delay, transmit the message 15765_11_ECU1_SID\$01_PID\$20 .
<u>EVALUATION</u>	Pass if transmission is successful and the DUT transmits the message 15765_11_SID\$01_PID\$40 .
<u>ACTION- ECUSIM</u>	After the <i>P2_MIN</i> delay, transmit the message 15765_11_ECU1_SID\$01_PID\$40 .
<u>EVALUATION</u>	Pass if transmission is successful and the DUT indicates that PIDs \$01, \$0C, and \$41 are supported for ECU #1.

Figure 59 - Verify an ISO 15765-4 SID \$01 PID supported PID request (11-bit, 500K)

9.2.2 Verify a SID \$01 PID Supported PID Requests (29-bit, 500K; 1 ECU)

Test ID:	\$30101001
Purpose:	The purpose of this test is to verify that the DUT can correctly request a SID \$01 PID Supported PIDs.
Rationale:	This test will use positive responses from a single different ECU.
Set Up:	The DUT and ECUSIM shall be in the "ISO 15765 (29-bit, 500K, 2 ECUs) Initialized State", which is detailed in 5.4.3.10.
Procedure:	
<u>ACTION- DUT</u>	Initiate the request for SID \$01 PID Supported PIDs.
<u>EVALUATION</u>	Pass if the 15765_29_SID\$01_PID\$00 message was transmitted
<u>ACTION- ECUSIM</u>	After the <i>P2_MIN</i> delay, transmit the message 15765_29_ECU1_SID\$01_PID\$00_20 .
<u>EVALUATION</u>	Pass if transmission is successful and the DUT transmits the message 15765_29_SID\$01_PID\$20 .
<u>ACTION- ECUSIM</u>	After the <i>P2_MIN</i> delay, transmit the message 15765_29_ECU1_SID\$01_PID\$20 .
<u>EVALUATION</u>	Pass if transmission is successful and the DUT transmits the message 15765_29_SID\$01_PID\$40 .
<u>ACTION- ECUSIM</u>	After the <i>P2_MIN</i> delay, transmit the message 15765_29_ECU1_SID\$01_PID\$40 .
<u>EVALUATION</u>	Pass if transmission is successful and the DUT indicates that PIDs \$01, \$0C, and \$41 are supported for ECU #1.

Figure 60 - Verify an ISO 15765-4 SID \$01 PID supported PID request (29-bit, 500K)

9.2.3 Verify a SID \$01 PID Supported PID Requests - Group (11-bit, 500K; 1 ECU)

Test ID:	\$30101002
Purpose:	The purpose of this test is to verify that the DUT can correctly request a SID \$01 PID Supported PIDs as a group.
Rationale:	This test will use positive responses from a single different ECU using a group request/response.
Set Up:	The DUT and ECUSIM shall be in the “ISO 15765 (11-bit, 500K, 2 ECUs) Initialized State”, which is detailed in 5.4.3.9.
Procedure:	
<u>ACTION- DUT</u>	Initiate the request for SID \$01 PID Supported PIDs as a group request.
<u>EVALUATION</u>	Pass if the 15765_11_SID\$01_PID\$00-\$E0 message was transmitted.
<u>ACTION- ECUSIM</u>	After the <i>P2_MIN</i> delay, transmit the message 15765_11_ECU1_SID\$01_PID\$00-\$E0 .
<u>EVALUATION</u>	Pass if transmission is successful and the DUT indicates that PIDs \$01, \$0C, and \$41 are supported for ECU #1.

Figure 61 - Verify an ISO 15765-4 SID \$01 PID supported PID request - group (11-bit, 500K)

9.2.4 Verify a SID \$01 PID Supported PID Requests - Group (29-bit, 500K; 1 ECU)

Test ID:	\$30101003
Purpose:	The purpose of this test is to verify that the DUT can correctly request a SID \$01 PID Supported PIDs as a group.
Rationale:	This test will use positive responses from a single different ECU using a group request/response.
Set Up:	The DUT and ECUSIM shall be in the “ISO 15765 (29-bit, 500K, 2 ECUs) Initialized State”, which is detailed in 5.4.3.10.
Procedure:	
<u>ACTION- DUT</u>	Initiate the request for SID \$01 PID Supported PIDs as a group request.
<u>EVALUATION</u>	Pass if the 15765_29_SID\$01_PID\$00-\$E0 message was transmitted.
<u>ACTION- ECUSIM</u>	After the <i>P2_MIN</i> delay, transmit the message 15765_29_ECU1_SID\$01_PID\$00-\$E0 .
<u>EVALUATION</u>	Pass if transmission is successful and the DUT indicates that PIDs \$01, \$0C, and \$41 are supported for ECU #1.

Figure 62 - Verify an ISO 15765-4 SID \$01 PID supported PID request - group (29-bit, 500K)

9.2.5 Verify a SID \$01 PID Requests (11-bit, 500K; 1 ECU)

Test ID:	\$30101004
Purpose:	The purpose of this test is to verify that the DUT can correctly request several SID \$01 PIDs.
Rationale:	This test will use positive responses from a single different ECU.
Set Up:	The DUT and ECUSIM shall be in the "ISO 15765 (11-bit, 500K, 2 ECUs) Initialized State", which is detailed in 5.4.3.9.
Procedure:	
ACTION- DUT	Initiate the request for SID \$01 PIDs \$01, \$0C, and \$41 from ECU #1.
ACTION- ECUSIM	If the DUT transmits the message 15765_11_SID\$01_PID\$01, then after the delay <i>P2_MIN</i>, transmit the message 15765_11_ECU1_SID\$01_PID\$01_SPARK. Wait for the remaining message transactions in this ACTION to be completed. If the DUT transmits the message 15765_11_SID\$01_PID\$0C, then after the delay <i>P2_MIN</i> and transmit the message 15765_11_ECU1_SID\$01_PID\$0C. Wait for the remaining message transactions in this ACTION to be completed. If the DUT transmits the message 15765_11_SID\$01_PID\$41, then after the delay <i>P2_MIN</i> and transmit the message 15765_11_ECU1_SID\$01_PID\$41. Wait for the remaining message transactions in this ACTION to be completed.
EVALUATION	Pass if the following is true: All three messages were successfully received and the corresponding responses were successfully transmitted. The DUT indicates that PIDs \$01, \$0C, and \$41 are supported for ECU #1. PID \$01 for ECU #1 has the following values: MIL is OFF DCT COUNT is 0 SPARK IGNITION MONITORS are SUPPORTED MISFIRE is SUPPORTED and READY FUEL SYSTEM MONITORING is SUPPORTED and READY COMPREHENSIVE COMPONENT MONITORING is SUPPORTED and READY CATALYST MONITORING is SUPPORTED and NOT READY HEATED CATALYST MONITORING is SUPPORTED and NOT READY EVAPORATIVE SYSTEM MONITORING is SUPPORTED and NOT READY SECONDARY AIR SYSTEM MONITORING is SUPPORTED and NOT READY OXYGEN SENSOR MONITORING is SUPPORTED and NOT READY OXYGEN SENSOR HEATER MONITORING is SUPPORTED and NOT READY EGR/VVT SYSTEM MONITORING is SUPPORTED and NOT READY PID \$0C for ECU #1 indicates that engine RPM is 0. PID \$41 for ECU #1 has the following values: MIL is OFF DCT COUNT is 0 SPARK IGNITION MONITORS are SUPPORTED MISFIRE is SUPPORTED and READY FUEL SYSTEM MONITORING is SUPPORTED and READY COMPREHENSIVE COMPONENT MONITORING is SUPPORTED and READY CATALYST MONITORING is SUPPORTED and NOT READY HEATED CATALYST MONITORING is SUPPORTED and NOT READY EVAPORATIVE SYSTEM MONITORING is SUPPORTED and NOT READY SECONDARY AIR SYSTEM MONITORING is SUPPORTED and NOT READY OXYGEN SENSOR MONITORING is SUPPORTED and NOT READY OXYGEN SENSOR HEATER MONITORING is SUPPORTED and NOT READY EGR/VVT SYSTEM MONITORING is SUPPORTED and NOT READY.

Figure 63 - Verify an ISO 15765-4 SID \$01 PID request (11-bit, 500K)

9.2.6 Verify a SID \$01 PID Requests (29-bit, 500K; 1 ECU)

Test ID:	\$30101005
Purpose:	The purpose of this test is to verify that the DUT can correctly request several SID \$01 PIDs.
Rationale:	This test will use positive responses from a single different ECU.
Set Up:	The DUT and ECUSIM shall be in the “ISO 15765 (29-bit, 500K, 2 ECUs) Initialized State”, which is detailed in 5.4.3.10.
Procedure:	
ACTION- DUT	Initiate the request for SID \$01 PIDs \$01, \$0C, and \$41 from ECU #1.
ACTION- ECUSIM	If the DUT transmits the message 15765_29_SID\$01_PID\$01, then after the delay <i>P2_MIN</i> and transmit the message 15765_29_ECU1_SID\$01_PID\$01_SPARK. Wait for the remaining message transactions in this ACTION to be completed. If the DUT transmits the message 15765_29_SID\$01_PID\$0C, then after the delay <i>P2_MIN</i> and transmit the message 15765_29_ECU1_SID\$01_PID\$0C. Wait for the remaining message transactions in this ACTION to be completed. If the DUT transmits the message 15765_29_SID\$01_PID\$41, then after the delay <i>P2_MIN</i> and transmit the message 15765_29_ECU1_SID\$01_PID\$41.
EVALUATION	Pass if the following is true: All three messages were successfully received and the corresponding responses were successfully transmitted. The DUT indicates that PIDs \$01, \$0C, and \$41 are supported for ECU #1. PID \$01 for ECU #1 has the following values: MIL is OFF DCT COUNT is 0 SPARK IGNITION MONITORS are SUPPORTED MISFIRE is SUPPORTED and READY FUEL SYSTEM MONITORING is SUPPORTED and READY COMPREHENSIVE COMPONENT MONITORING is SUPPORTED and READY CATALYST MONITORING is SUPPORTED and NOT READY HEATED CATALYST MONITORING is SUPPORTED and NOT READY EVAPORATIVE SYSTEM MONITORING is SUPPORTED and NOT READY SECONDARY AIR SYSTEM MONITORING is SUPPORTED and NOT READY OXYGEN SENSOR MONITORING is SUPPORTED and NOT READY OXYGEN SENSOR HEATER MONITORING is SUPPORTED and NOT READY EGR/VVT SYSTEM MONITORING is SUPPORTED and NOT READY PID \$0C for ECU #1 indicates that engine RPM is 0. PID \$41 for ECU #1 has the following values: MIL is OFF DCT COUNT is 0 SPARK IGNITION MONITORS are SUPPORTED MISFIRE is SUPPORTED and READY FUEL SYSTEM MONITORING is SUPPORTED and READY COMPREHENSIVE COMPONENT MONITORING is SUPPORTED and READY CATALYST MONITORING is SUPPORTED and NOT READY HEATED CATALYST MONITORING is SUPPORTED and NOT READY EVAPORATIVE SYSTEM MONITORING is SUPPORTED and NOT READY SECONDARY AIR SYSTEM MONITORING is SUPPORTED and NOT READY OXYGEN SENSOR MONITORING is SUPPORTED and NOT READY OXYGEN SENSOR HEATER MONITORING is SUPPORTED and NOT READY EGR/VVT SYSTEM MONITORING is SUPPORTED and NOT READY.

Figure 64 - Verify an ISO 15765-4 SID \$01 PID request (29-bit, 500K)

9.2.7 Verify a SID \$01 PID Requests - Group Req. (11-bit, 500K; 1 ECU)

Test ID:	\$30101006
Purpose:	The purpose of this test is to verify that the DUT can correctly request several SID \$01 PIDs as a group.
Rationale:	This test will use positive responses from a single different ECU using a group request/response.
Set Up:	The DUT and ECUSIM shall be in the "ISO 15765 (11-bit, 500K, 2 ECUs) Initialized State", which is detailed in 5.4.3.9.
Procedure:	
<u>ACTION- DUT</u>	Initiate the request for SID \$01 PIDs \$01, \$0C, and \$41 from ECU #1 as a group request.
<u>EVALUATION</u>	Pass if the DUT transmits the message 15765_11_SID\$01_PID\$01-\$0C-\$41 .
<u>ACTION- ECUSIM</u>	After the <i>P2_MIN</i> delay, transmit the message 15765_11_ECU1_SID\$01_PID\$01-\$0C-\$41 .
<u>EVALUATION</u>	Pass if the following is true: Transmission is successful. The DUT indicates that PIDs \$01, \$0C, and \$41 are supported for ECU #1. PID \$01 for ECU #1 has the following values: - MIL is OFF - DCT COUNT is 0 - SPARK IGNITION MONITORS are SUPPORTED - MISFIRE is SUPPORTED and READY - FUEL SYSTEM MONITORING is SUPPORTED and READY - COMPREHENSIVE COMPONENT MONITORING is SUPPORTED and READY - CATALYST MONITORING is SUPPORTED and NOT READY - HEATED CATALYST MONITORING is SUPPORTED and NOT READY - EVAPORATIVE SYSTEM MONITORING is SUPPORTED and NOT READY - SECONDARY AIR SYSTEM MONITORING is SUPPORTED and NOT READY - OXYGEN SENSOR MONITORING is SUPPORTED and NOT READY - OXYGEN SENSOR HEATER MONITORING is SUPPORTED and NOT READY - EGR/VVT SYSTEM MONITORING is SUPPORTED and NOT READY PID \$0C for ECU #1 indicates that engine RPM is 0. PID \$41 for ECU #1 has the following values: - MIL is OFF - DCT COUNT is 0 - SPARK IGNITION MONITORS are SUPPORTED - MISFIRE is SUPPORTED and READY - FUEL SYSTEM MONITORING is SUPPORTED and READY - COMPREHENSIVE COMPONENT MONITORING is SUPPORTED and READY - CATALYST MONITORING is SUPPORTED and NOT READY - HEATED CATALYST MONITORING is SUPPORTED and NOT READY - EVAPORATIVE SYSTEM MONITORING is SUPPORTED and NOT READY - SECONDARY AIR SYSTEM MONITORING is SUPPORTED and NOT READY - OXYGEN SENSOR MONITORING is SUPPORTED and NOT READY - OXYGEN SENSOR HEATER MONITORING is SUPPORTED and NOT READY - EGR/VVT SYSTEM MONITORING is SUPPORTED and NOT READY.

Figure 65 - Verify an ISO 15765-4 SID \$01 PID request - group (11-bit, 500K)

9.2.8 Verify a SID \$01 PID Requests - Group Req. (29-bit, 500K; 1 ECU)

Test ID:	\$30101007
Purpose:	The purpose of this test is to verify that the DUT can correctly request several SID \$01 PIDs as a group.
Rationale:	This test will use positive responses from a single different ECU using a group request/response.
Set Up:	The DUT and ECUSIM shall be in the "ISO 15765 (29-bit, 500K, 2 ECUs) Initialized State", which is detailed in 5.4.3.10.
Procedure:	
<u>ACTION- DUT</u>	Initiate the request for SID \$01 PIDs \$01, \$0C, and \$41 from ECU #1 as a group request.
<u>EVALUATION</u>	Pass if the DUT transmits the message 15765_29_SID\$01_PID\$01-\$0C-\$41 .
<u>ACTION- ECUSIM</u>	After the <i>P2_MIN</i> delay, transmit the message 15765_29_ECU1_SID\$01_PID\$01-\$0C-\$41 .
<u>EVALUATION</u>	Pass if the following is true: Transmission is successful. The DUT indicates that PIDs \$01, \$0C, and \$41 are supported for ECU #1. PID \$01 for ECU #1 has the following values: - MIL is OFF - DCT COUNT is 0 - SPARK IGNITION MONITORS are SUPPORTED - MISFIRE is SUPPORTED and READY - FUEL SYSTEM MONITORING is SUPPORTED and READY - COMPREHENSIVE COMPONENT MONITORING is SUPPORTED and READY - CATALYST MONITORING is SUPPORTED and NOT READY - HEATED CATALYST MONITORING is SUPPORTED and NOT READY - EVAPORATIVE SYSTEM MONITORING is SUPPORTED and NOT READY - SECONDARY AIR SYSTEM MONITORING is SUPPORTED and NOT READY - OXYGEN SENSOR MONITORING is SUPPORTED and NOT READY - OXYGEN SENSOR HEATER MONITORING is SUPPORTED and NOT READY - EGR/VVT SYSTEM MONITORING is SUPPORTED and NOT READY PID \$0C for ECU #1 indicates that engine RPM is 0. PID \$41 for ECU #1 has the following values: - MIL is OFF - DCT COUNT is 0 - SPARK IGNITION MONITORS are SUPPORTED - MISFIRE is SUPPORTED and READY - FUEL SYSTEM MONITORING is SUPPORTED and READY - COMPREHENSIVE COMPONENT MONITORING is SUPPORTED and READY - CATALYST MONITORING is SUPPORTED and NOT READY - HEATED CATALYST MONITORING is SUPPORTED and NOT READY - EVAPORATIVE SYSTEM MONITORING is SUPPORTED and NOT READY - SECONDARY AIR SYSTEM MONITORING is SUPPORTED and NOT READY - OXYGEN SENSOR MONITORING is SUPPORTED and NOT READY - OXYGEN SENSOR HEATER MONITORING is SUPPORTED and NOT READY - EGR/VVT SYSTEM MONITORING is SUPPORTED and NOT READY.

Figure 66 - Verify an ISO 15765-4 SID \$01 PID request - group (29-bit, 500K)

9.2.9 Verify a SID \$01 PID \$01 Request for Spark Ignition (11-bit, 500K; 2 ECUs w/ Order Swap)

Test ID:	\$30101008
Purpose:	The purpose of this test is to verify that the DUT can correctly request a SID \$01 PID, which the ECUSIM indicates is supported.
Rationale:	This test will use positive responses from two different ECUs. The order of ECU responses will be different than that of the original connection order. This test will also verify that the DUT can differentiate a spark ignition response from a compression ignition response.
Set Up:	The DUT and ECUSIM shall be in the "ISO 15765 (11-bit, 500K, 2 ECUs) Initialized State", which is detailed in 5.4.3.9.
Procedure:	
<u>ACTION- DUT</u>	Initiate the request for SID \$01 PID \$01 (I/M Readiness Bits).
<u>EVALUATION</u>	Pass if the 15765_11_SID\$01_PID\$01 message was transmitted.
<u>ACTION- ECUSIM</u>	After the <i>P2_MIN</i> delay, transmit the message 15765_11_ECU2_SID\$01_PID\$01_SPARK , delay <i>P2_MIN</i> , then transmit the message 15765_11_ECU1_SID\$01_PID\$01_SPARK .
<u>EVALUATION</u>	Pass if the following is true: Transmission is successful. The DUT indicates that ECU #1 has the following values: MIL is OFF DCT COUNT is 0 SPARK IGNITION MONITORS are SUPPORTED MISFIRE is SUPPORTED and READY FUEL SYSTEM MONITORING is SUPPORTED and READY COMPREHENSIVE COMPONENT MONITORING is SUPPORTED and READY CATALYST MONITORING is SUPPORTED and NOT READY HEATED CATALYST MONITORING is SUPPORTED and NOT READY EVAPORATIVE SYSTEM MONITORING is SUPPORTED and NOT READY SECONDARY AIR SYSTEM MONITORING is SUPPORTED and NOT READY OXYGEN SENSOR MONITORING is SUPPORTED and NOT READY OXYGEN SENSOR HEATER MONITORING is SUPPORTED and NOT READY EGR/VVT SYSTEM MONITORING is SUPPORTED and NOT READY The DUT indicates that ECU #2 has the following values: MIL is ON DCT COUNT is 1 SPARK IGNITION MONITORS are SUPPORTED COMPREHENSIVE COMPONENT MONITORING is SUPPORTED and NOT READY

Figure 67 - Verify an ISO 15765-4 SID \$01 PID \$01 request for spark ignition (11-bit, 500K)

9.2.10 Verify a SID \$01 PID \$01 Request for Spark Ignition (29-bit, 500K; 2 ECUs w/ Order Swap)

Test ID:	\$30101009
Purpose:	The purpose of this test is to verify that the DUT can correctly request a SID \$01 PID, which the ECUSIM indicates is supported.
Rationale:	This test will use positive responses from two different ECUs. The order of ECU responses will be different than that of the original connection order. This test will also verify that the DUT can differentiate a spark ignition response from a compression ignition response.
Set Up:	The DUT and ECUSIM shall be in the "ISO 15765 (29-bit, 500K, 2 ECUs) Initialized State", which is detailed in 5.4.3.10.
Procedure:	
<u>ACTION- DUT</u>	Initiate the request for SID \$01 PID \$01 (I/M Readiness Bits).
<u>EVALUATION</u>	Pass if the 15765_29_SID\$01_PID\$01 message was transmitted.
<u>ACTION- ECUSIM</u>	After the <i>P2_MIN</i> delay, transmit the message 15765_29_ECU2_SID\$01_PID\$01_SPARK , delay <i>P2_MIN</i> , then transmit the message 15765_29_ECU1_SID\$01_PID\$01_SPARK .
<u>EVALUATION</u>	Pass if the following is true: Transmission is successful. The DUT indicates that ECU #1 has the following values: MIL is OFF DCT COUNT is 0 SPARK IGNITION MONITORS are SUPPORTED MISFIRE is SUPPORTED and READY FUEL SYSTEM MONITORING is SUPPORTED and READY COMPREHENSIVE COMPONENT MONITORING is SUPPORTED and READY CATALYST MONITORING is SUPPORTED and NOT READY HEATED CATALYST MONITORING is SUPPORTED and NOT READY EVAPORATIVE SYSTEM MONITORING is SUPPORTED and NOT READY SECONDARY AIR SYSTEM MONITORING is SUPPORTED and NOT READY OXYGEN SENSOR MONITORING is SUPPORTED and NOT READY OXYGEN SENSOR HEATER MONITORING is SUPPORTED and NOT READY EGR/VVT SYSTEM MONITORING is SUPPORTED and NOT READY The DUT indicates that ECU #2 has the following values: MIL is ON DCT COUNT is 1 SPARK IGNITION MONITORS are SUPPORTED COMPREHENSIVE COMPONENT MONITORING is SUPPORTED and NOT READY

Figure 68 - Verify an ISO 15765-4 SID \$01 PID \$01 request for spark ignition (29-bit, 500K)

9.2.11 Verify a SID \$01 PID \$01 Request for Compression Ignition (11-bit, 500K; 2 ECUs w/ Order Swap)

Test ID:	\$3010100A
Purpose:	The purpose of this test is to verify that the DUT can correctly request a SID \$01 PID, which the ECUSIM indicates is supported.
Rationale:	This test will use positive responses from two different ECUs. The order of ECU responses will be different than that of the original connection order. This test will also verify that the DUT can differentiate a spark ignition response from a compression ignition response.
Set Up:	The DUT and ECUSIM shall be in the "ISO 15765 (11-bit, 500K, 2 ECUs) Initialized State", which is detailed in 5.4.3.9.
Procedure:	
<u>ACTION- DUT</u>	Initiate the request for SID \$01 PID \$01 (I/M Readiness Bits).
<u>EVALUATION</u>	Pass if the 15765_11_SID\$01_PID\$01 message was transmitted.
<u>ACTION- ECUSIM</u>	After the <i>P2_MIN</i> delay, transmit the message 15765_11_ECU2_SID\$01_PID\$01_COMP , delay <i>P2_MIN</i> , then transmit the message 15765_11_ECU1_SID\$01_PID\$01_COMP .
<u>EVALUATION</u>	Pass if the following is true: Transmission is successful. The DUT indicates that ECU #1 has the following values: MIL is OFF DCT COUNT is 0 COMPRESSION IGNITION MONITORS are SUPPORTED MISFIRE is SUPPORTED and READY FUEL SYSTEM MONITORING is SUPPORTED and READY COMPREHENSIVE COMPONENT MONITORING is SUPPORTED and READY NMHC MONITORING is SUPPORTED and NOT READY NOX AFTERTREATMENT MONITORING is SUPPORTED and NOT READY BOOST PRESSURE SYSTEM MONITORING is SUPPORTED and NOT READY EXHAUST GAS SENSOR MONITORING is SUPPORTED and NOT READY PM FILTER MONITORING is SUPPORTED and NOT READY EGR/VVT SYSTEM MONITORING is SUPPORTED and NOT READY The DUT indicates that ECU #2 has the following values: MIL is ON DCT COUNT is 1 COMPRESSION IGNITION MONITORS are SUPPORTED COMPREHENSIVE COMPONENT MONITORING is SUPPORTED and NOT READY

Figure 69 - Verify an ISO 15765-4 SID \$01 PID \$01 request for compression ignition (11-bit, 500K)

9.2.12 Verify a SID \$01 PID \$01 Request for Compression Ignition (29-bit, 500K; 2 ECUs w/ Order Swap)

Test ID:	\$3010100B
Purpose:	The purpose of this test is to verify that the DUT can correctly request a SID \$01 PID, which the ECUSIM indicates is supported.
Rationale:	This test will use positive responses from two different ECUs. The order of ECU responses will be different than that of the original connection order. This test will also verify that the DUT can differentiate a spark ignition response from a compression ignition response.
Set Up:	The DUT and ECUSIM shall be in the "ISO 15765 (29-bit, 500K, 2 ECUs) Initialized State", which is detailed in 5.4.3.10.
Procedure:	
<u>ACTION- DUT</u>	Initiate the request for SID \$01 PID \$01 (I/M Readiness Bits).
<u>EVALUATION</u>	Pass if the 15765_29_SID\$01_PID\$01 message was transmitted.
<u>ACTION- ECUSIM</u>	After the <i>P2_MIN</i> delay, transmit the message 15765_29_ECU2_SID\$01_PID\$01_COMP , delay <i>P2_MIN</i> , then transmit the message 15765_29_ECU1_SID\$01_PID\$01_COMP .
<u>EVALUATION</u>	Pass if the following is true: Transmission is successful. The DUT indicates that ECU #1 has the following values: MIL is OFF DCT COUNT is 0 COMPRESSION IGNITION MONITORS are SUPPORTED MISFIRE is SUPPORTED and READY FUEL SYSTEM MONITORING is SUPPORTED and READY COMPREHENSIVE COMPONENT MONITORING is SUPPORTED and READY NMHC MONITORING is SUPPORTED and NOT READY NOX AFTERTREATMENT MONITORING is SUPPORTED and NOT READY BOOST PRESSURE SYSTEM MONITORING is SUPPORTED and NOT READY EXHAUST GAS SENSOR MONITORING is SUPPORTED and NOT READY PM FILTER MONITORING is SUPPORTED and NOT READY EGR/VVT SYSTEM MONITORING is SUPPORTED and NOT READY The DUT indicates that ECU #2 has the following values: MIL is ON DCT COUNT is 1 COMPRESSION IGNITION MONITORS are SUPPORTED COMPREHENSIVE COMPONENT MONITORING is SUPPORTED and NOT READY

Figure 70 - Verify an ISO 15765-4 SID \$01 PID \$01 request for compression ignition (29-bit, 500K)

9.2.13 Verify a SID \$01 PID \$0C Request (11-bit, 500K; 2 ECUs w/ Order Swap)

Test ID:	\$3010100C
Purpose:	The purpose of this test is to verify that the DUT can correctly request a SID \$01 PID, which the ECUSIM indicates is supported.
Rationale:	This test will use positive responses from two different ECUs. The order of ECU responses will be different than that of the original connection order.
Set Up:	The DUT and ECUSIM shall be in the “ISO 15765 (11-bit, 500K, 2 ECUs) Initialized State”, which is detailed in 5.4.3.9.
Procedure:	
<u>ACTION- DUT</u>	Initiate the request for SID \$01 PID \$0C (RPM).
<u>EVALUATION</u>	Pass if the 15765_11_SID\$01_PID\$0C message was transmitted.
<u>ACTION- ECUSIM</u>	After the <i>P2_MIN</i> delay, transmit the message 15765_11_ECU2_SID\$01_PID\$0C_KOEO , delay <i>P2_MIN</i> , then transmit the message 15765_11_ECU1_SID\$01_PID\$0C_KOEO .
<u>EVALUATION</u>	Pass if transmission is successful and the DUT indicates that engine RPM is 0.

Figure 71 - Verify an ISO 15765-4 SID \$01 PID \$0C request (11-bit, 500K)

9.2.14 Verify a SID \$01 PID \$0C Request (29-bit, 500K; 2 ECUs w/ Order Swap)

Test ID:	\$3010100D
Purpose:	The purpose of this test is to verify that the DUT can correctly request a SID \$01 PID, which the ECUSIM indicates is supported.
Rationale:	This test will use positive responses from two different ECUs. The order of ECU responses will be different than that of the original connection order.
Set Up:	The DUT and ECUSIM shall be in the “ISO 15765 (29-bit, 500K, 2 ECUs) Initialized State”, which is detailed in 5.4.3.10.
Procedure:	
<u>ACTION- DUT</u>	Initiate the request for SID \$01 PID \$0C (RPM).
<u>EVALUATION</u>	Pass if the 15765_29_SID\$01_PID\$0C message was transmitted.
<u>ACTION- ECUSIM</u>	After the <i>P2_MIN</i> delay, transmit the message 15765_29_ECU2_SID\$01_PID\$0C_KOEO , delay <i>P2_MIN</i> , then transmit the message 15765_29_ECU1_SID\$01_PID\$0C_KOEO .
<u>EVALUATION</u>	Pass if transmission is successful and the DUT indicates that engine RPM is 0.

Figure 72 - Verify an ISO 15765-4 SID \$01 PID \$0C request (29-bit, 500K)

9.2.15 Verify a SID \$02 PID Freeze Frame DTC Request with no DTCs (11-bit, 500K; 2 ECUs w/ Order Swap)

Test ID:	\$30102000
Purpose:	The purpose of this test is to verify that the DUT can correctly request SID \$02 PID \$02 (indicating that there is no Freeze Frame DTC), which the ECUSIM indicates is supported.
Rationale:	This test will use positive responses from two different ECUs. The order of ECU responses will be different than that of the original connection order.
Set Up:	The DUT and ECUSIM shall be in the “ISO 15765 (11-bit, 500K, 2 ECUs) Initialized State”, which is detailed in 5.4.3.9.
Procedure:	
<u>ACTION- DUT</u>	Initiate the request for SID \$02 PID \$02 (the Freeze Frame DTC).
<u>EVALUATION</u>	Pass if the 15765_11_SID\$02_PID\$02 message was transmitted.
<u>ACTION- ECUSIM</u>	After the <i>P2_MIN</i> delay, transmit the message 15765_11_ECU2_SID\$02_PID\$02_NoDTC , delay <i>P2_MIN</i> , then transmit the message 15765_11_ECU1_SID\$02_PID\$02_NoDTC .
<u>EVALUATION</u>	Pass if transmission is successful and the DUT indicates that there is no Freeze Frame DTC in either ECU.

Figure 73 - Verify an ISO 15765-4 SID \$02 PID freeze frame DTC request with no DTCs (11-bit, 500K)

9.2.16 Verify a SID \$02 PID Freeze Frame DTC Request with No DTCs (29-bit, 500K; 2 ECUs w/ Order Swap)

Test ID:	\$30102001
Purpose:	The purpose of this test is to verify that the DUT can correctly request SID \$02 PID \$02 (indicating that there is no Freeze Frame DTC), which the ECUSIM indicates is supported.
Rationale:	This test will use positive responses from two different ECUs. The order of ECU responses will be different than that of the original connection order.
Set Up:	The DUT and ECUSIM shall be in the “ISO 15765 (29-bit, 500K, 2 ECUs) Initialized State”, which is detailed in 5.4.3.10.
Procedure:	
<u>ACTION- DUT</u>	Initiate the request for SID \$02 PID \$02 (the Freeze Frame DTC).
<u>EVALUATION</u>	Pass if the 15765_29_SID\$02_PID\$02 message was transmitted.
<u>ACTION- ECUSIM</u>	After the <i>P2_MIN</i> delay, transmit the message 15765_29_ECU2_SID\$02_PID\$02_NoDTC , delay <i>P2_MIN</i> , then transmit the message 15765_29_ECU1_SID\$02_PID\$02_NoDTC .
<u>EVALUATION</u>	Pass if transmission is successful and the DUT indicates that there is no Freeze Frame DTC in either ECU.

Figure 74 - Verify an ISO 15765-4 SID \$02 PID freeze frame DTC request with no DTCs (29-bit, 500K)

9.2.17 Verify a SID \$02 PID Freeze Frame DTC Request with DTCs (11-bit, 500K; 2 ECUs)

Test ID:	\$30102002
Purpose:	The purpose of this test is to verify that the DUT can correctly request SID \$02 PID \$02 (indicating that there is a Freeze Frame DTC), which the ECUSIM indicates is supported.
Rationale:	This test will use positive responses from two different ECUs.
Set Up:	The DUT and ECUSIM shall be in the "ISO 15765 (11-bit, 500K, 2 ECUs) Initialized State", which is detailed in 5.4.3.9.
Procedure:	
<u>ACTION- DUT</u>	Initiate the request for SID \$02 PID \$02 (the Freeze Frame DTC).
<u>EVALUATION</u>	Pass if the 15765_11_SID\$02_PID\$02 message was transmitted.
<u>ACTION- ECUSIM</u>	After the <i>P2_MIN</i> delay, transmit the message 15765_11_ECU1_SID\$02_PID\$02_DTC , delay <i>P2_MIN</i> , then transmit the message 15765_11_ECU2_SID\$02_PID\$02_NoDTC .
<u>EVALUATION</u>	Pass if the following is true: The transmission is successful. The DUT indicates that ECU #1 has a Freeze Frame DTC of P0107 and ECU #2 has no Freeze Frame DTC.

Figure 75 - Verify an ISO 15765-4 SID \$02 PID freeze frame DTC request with DTCs (11-bit, 500K)

9.2.18 Verify a SID \$02 PID Freeze Frame DTC Request with DTCs (29-bit, 500K; 2 ECUs)

Test ID:	\$30102003
Purpose:	The purpose of this test is to verify that the DUT can correctly request SID \$02 PID \$02 (indicating that there is a Freeze Frame DTC), which the ECUSIM indicates is supported.
Rationale:	This test will use positive responses from two different ECUs.
Set Up:	The DUT and ECUSIM shall be in the "ISO 15765 (29-bit, 500K, 2 ECUs) Initialized State", which is detailed in 5.4.3.10.
Procedure:	
<u>ACTION- DUT</u>	Initiate the request for SID \$02 PID \$02 (the Freeze Frame DTC).
<u>EVALUATION</u>	Pass if the 15765_29_SID\$02_PID\$02 message was transmitted.
<u>ACTION- ECUSIM</u>	After the <i>P2_MIN</i> delay, transmit the message 15765_29_ECU1_SID\$02_PID\$02_DTC , delay <i>P2_MIN</i> , then transmit the message 15765_29_ECU2_SID\$02_PID\$02_NoDTC .
<u>EVALUATION</u>	Pass if the following is true: The transmission is successful. The DUT indicates that ECU #1 has a Freeze Frame DTC of P0107 and ECU #2 has no Freeze Frame DTC.

Figure 76 - Verify an ISO 15765-4 SID \$02 PID freeze frame DTC request with DTCs (29-bit, 500K)

9.2.19 Verify a SID \$03 Confirmed DTC Request with No DTCs (11-bit, 500K; 2 ECUs w/ Order Swap)

Test ID:	\$30103000
Purpose:	The purpose of this test is to verify that the DUT can correctly request SID \$03 and process a 'no DTCs present' response.
Rationale:	This test will use positive responses from two different ECUs. The order of ECU responses will be different than that of the original connection order.
Set Up:	The DUT and ECUSIM shall be in the "ISO 15765 (11-bit, 500K, 2 ECUs) Initialized State", which is detailed in 5.4.3.9.
Procedure:	
<u>ACTION- DUT</u>	Initiate the request for SID \$03 (Confirmed DTCs).
<u>EVALUATION</u>	Pass if the 15765_11_SID\$03 message was transmitted.
<u>ACTION- ECUSIM</u>	After the <i>P2_MIN</i> delay, transmit the message 15765_11_ECU2_SID\$03_NoDTC , delay <i>P2_MIN</i> , then transmit the message 15765_11_ECU1_SID\$03_NoDTC .
<u>EVALUATION</u>	Pass if transmission is successful and the DUT indicates that there are no confirmed DTCs in either ECU.

Figure 77 - Verify an ISO 15765-4 SID \$03 confirmed DTC request with no DTCs (11-bit, 500K)

9.2.20 Verify a SID \$03 Confirmed DTC Request with No DTCs (29-bit, 500K; 2 ECUs w/ Order Swap)

Test ID:	\$30103001
Purpose:	The purpose of this test is to verify that the DUT can correctly request SID \$03 and process a 'no DTCs present' response.
Rationale:	This test will use positive responses from two different ECUs. The order of ECU responses will be different than that of the original connection order.
Set Up:	The DUT and ECUSIM shall be in the "ISO 15765 (29-bit, 500K, 2 ECUs) Initialized State", which is detailed in 5.4.3.10.
Procedure:	
<u>ACTION- DUT</u>	Initiate the request for SID \$03 (Confirmed DTCs).
<u>EVALUATION</u>	Pass if the 15765_29_SID\$03 message was transmitted.
<u>ACTION- ECUSIM</u>	After the <i>P2_MIN</i> delay, transmit the message 15765_29_ECU2_SID\$03_NoDTC , delay <i>P2_MIN</i> , then transmit the message 15765_29_ECU1_SID\$03_NoDTC .
<u>EVALUATION</u>	Pass if transmission is successful and the DUT indicates that there are no confirmed DTCs in either ECU.

Figure 78 - Verify an ISO 15765-4 SID \$03 confirmed DTC request with no DTCs (29-bit, 500K)

9.2.21 Verify a SID \$03 Confirmed DTC Request with DTCs (11-bit, 500K; 2 ECUs)

Test ID:	\$30103002
Purpose:	The purpose of this test is to verify that the DUT can correctly request SID \$03 and process a 'DTCs present' response.
Rationale:	This test will use positive responses from two different ECUs.
Set Up:	The DUT and ECUSIM shall be in the "ISO 15765 (11-bit, 500K, 2 ECUs) Initialized State", which is detailed in 5.4.3.9.
Procedure:	
<u>ACTION- DUT</u>	Initiate the request for SID \$03 (Confirmed DTCs).
<u>EVALUATION</u>	Pass if the 15765_11_SID\$03 message was transmitted.
<u>ACTION- ECUSIM</u>	After the <i>P2_MIN</i> delay, transmit the message 15765_11_ECU1_SID\$03_DTC , delay <i>P2_MIN</i> , then transmit the message 15765_11_ECU2_SID\$03_NoDTC .
<u>EVALUATION</u>	Pass if the following is true: The transmission is successful. The DUT indicates that ECU #1 has the following confirmed DTCs: P0107, P0110, P0115, and P0124. The DUT indicates that ECU #2 has no confirmed DTCs.

Figure 79 - Verify an ISO 15765-4 SID \$03 confirmed DTC request with DTCs (11-bit, 500K)

9.2.22 Verify a SID \$03 Confirmed DTC Request with DTCs (29-bit, 500K; 2 ECUs)

Test ID:	\$30103003
Purpose:	The purpose of this test is to verify that the DUT can correctly request SID \$03 and process a 'DTCs present' response.
Rationale:	This test will use positive responses from two different ECUs.
Set Up:	The DUT and ECUSIM shall be in the "ISO 15765 (29-bit, 500K, 2 ECUs) Initialized State", which is detailed in 5.4.3.10.
Procedure:	
<u>ACTION- DUT</u>	Initiate the request for SID \$03 (Confirmed DTCs).
<u>EVALUATION</u>	Pass if the 15765_29_SID\$03 message was transmitted.
<u>ACTION- ECUSIM</u>	After the <i>P2_MIN</i> delay, transmit the message 15765_29_ECU1_SID\$03_DTC , delay <i>P2_MIN</i> , then transmit the message 15765_29_ECU2_SID\$03_NoDTC .
<u>EVALUATION</u>	Pass if the following is true: The transmission is successful. The DUT indicates that ECU #1 has the following confirmed DTCs: P0107, P0110, P0115, and P0124. The DUT indicates that ECU #2 has no confirmed DTCs.

Figure 80 - Verify an ISO 15765-4 SID \$03 confirmed DTC request with DTCs (29-bit, 500K)

9.2.23 Verify a SID \$04 Clear Codes Request (11-bit, 500K; 2 ECUs w/ Order Swap)

Test ID:	\$30104000
Purpose:	The purpose of this test is to verify that the DUT can correctly request SID \$04.
Rationale:	This test will use positive responses from two different ECUs. The order of ECU responses will be different than that of the original connection order.
Set Up:	The DUT and ECUSIM shall be in the “ISO 15765 (11-bit, 500K, 2 ECUs) Initialized State”, which is detailed in 5.4.3.9.
Procedure:	
<u>ACTION- DUT</u>	Initiate the request for SID \$04 (Clear DTCs).
<u>EVALUATION</u>	Pass if the 15765_11_SID\$04 message was transmitted.
<u>ACTION- ECUSIM</u>	After the <i>P2_MIN</i> delay, transmit the message 15765_11_ECU2_SID\$04_DONE , delay <i>P2_MIN</i> , then transmit the message 15765_11_ECU1_SID\$04_DONE .
<u>EVALUATION</u>	Pass if the transmission is successful and the DUT indicates that DTCs have been cleared.

Figure 81 - Verify an ISO 15765-4 SID \$04 clear codes request (11-bit, 500K)

9.2.24 Verify a SID \$04 Clear Codes Request (29-bit, 500K; 2 ECUs w/ Order Swap)

Test ID:	\$30104001
Purpose:	The purpose of this test is to verify that the DUT can correctly request SID \$04.
Rationale:	This test will use positive responses from two different ECUs. The order of ECU responses will be different than that of the original connection order.
Set Up:	The DUT and ECUSIM shall be in the “ISO 15765 (29-bit, 500K, 2 ECUs) Initialized State”, which is detailed in 5.4.3.10.
Procedure:	
<u>ACTION- DUT</u>	Initiate the request for SID \$04 (Clear DTCs).
<u>EVALUATION</u>	Pass if the 15765_29_SID\$04 message was transmitted.
<u>ACTION- ECUSIM</u>	After the <i>P2_MIN</i> delay, transmit the message 15765_29_ECU2_SID\$04_DONE , delay <i>P2_MIN</i> , then transmit the message 15765_29_ECU1_SID\$04_DONE .
<u>EVALUATION</u>	Pass if the transmission is successful and the DUT indicates that DTCs have been cleared.

Figure 82 - Verify an ISO 15765-4 SID \$04 clear codes request (29-bit, 500K)

9.2.25 Test a SID \$04 Clear Codes Request with NRC=\$22 (11-bit, 500K; 2 ECUs)

Test ID:	\$30104002
Purpose:	The purpose of this test is to verify that the DUT can correctly request SID \$04 when an ECU indicates that conditions are not correct.
Rationale:	This test will use negative responses (NRC \$22) from two different ECUs.
Set Up:	The DUT and ECUSIM shall be in the “ISO 15765 (11-bit, 500K, 2 ECUs) Initialized State”, which is detailed in 5.4.3.9.
Procedure:	
<u>ACTION- DUT</u>	Initiate the request for SID \$04 (Clear DTCs).
<u>EVALUATION</u>	Pass if the 15765_11_SID\$04 message was transmitted.
<u>ACTION- ECUSIM</u>	After the <i>P2_MIN</i> delay, transmit the message 15765_11_ECU1_SID\$04_NRC22 , delay <i>P2_MIN</i> , then transmit the message 15765_11_ECU2_SID\$04_NRC22 .
<u>EVALUATION</u>	Pass if the transmission is successful and the DUT indicates that DTCs have NOT been cleared.

Figure 83 - Test an ISO 15765-4 SID \$04 clear codes request with NRC=\$22 (11-bit, 500K)

9.2.26 Test a SID \$04 Clear Codes Request with NRC=\$22 (29-bit, 500K; 2 ECUs)

Test ID:	\$30104003
Purpose:	The purpose of this test is to verify that the DUT can correctly request SID \$04 when an ECU indicates that conditions are not correct.
Rationale:	This test will use negative responses (NRC \$22) from two different ECUs.
Set Up:	The DUT and ECUSIM shall be in the “ISO 15765 (29-bit, 500K, 2 ECUs) Initialized State”, which is detailed in 5.4.3.10.
Procedure:	
<u>ACTION- DUT</u>	Initiate the request for SID \$04 (Clear DTCs).
<u>EVALUATION</u>	Pass if the 15765_29_SID\$04 message was transmitted.
<u>ACTION- ECUSIM</u>	After the <i>P2_MIN</i> delay, transmit the message 15765_29_ECU1_SID\$04_NRC22 , delay <i>P2_MIN</i> , then transmit the message 15765_29_ECU2_SID\$04_NRC22 .
<u>EVALUATION</u>	Pass if the transmission is successful and the DUT indicates that DTCs have NOT been cleared.

Figure 84 - Test an ISO 15765-4 SID \$04 clear codes request with NRC=\$22 (29-bit, 500K)

9.2.27 Verify a SID \$04 Clear Codes Request with NRC=\$78 (11-bit, 500K; 2 ECUs)

Test ID:	\$30104004
Purpose:	The purpose of this test is to verify that the DUT can correctly request SID \$04 when an ECU indicates that it is busy then eventually competes.
Rationale:	This test will use positive responses from the first ECU and a response pending (NRC \$78) from a second ECU.
Set Up:	The DUT and ECUSIM shall be in the "ISO 15765 (11-bit, 500K, 2 ECUs) Initialized State", which is detailed in 5.4.3.9.
Procedure:	
<u>ACTION- DUT</u>	Initiate the request for SID \$04 (Clear DTCs).
<u>EVALUATION</u>	Pass if the 15765_11_SID\$04 message was transmitted.
<u>ACTION- ECUSIM</u>	After the <i>P2_MIN</i> delay, transmit the message 15765_11_ECU1_SID\$04_NRC78 , delay <i>P2_MIN</i> , then transmit the message 15765_11_ECU2_SID\$04_DONE .
<u>EVALUATION</u>	Pass if the transmission is successful.
<u>ACTION- ECUSIM</u>	After the <i>P2_78</i> delay, transmit the message 15765_11_ECU1_SID\$04_DONE
<u>EVALUATION</u>	Pass if the transmission is successful and the DUT indicates that DTCs have been cleared.

Figure 85 - Verify an ISO 15765-4 SID \$04 clear codes request with NRC=\$78 (11-bit, 500K)

9.2.28 Verify a SID \$04 Clear Codes Request with NRC=\$78 (29-bit, 500K; 2 ECUs)

Test ID:	\$30104005
Purpose:	The purpose of this test is to verify that the DUT can correctly request SID \$04 when an ECU indicates that it is busy then eventually competes.
Rationale:	This test will use positive responses from the first ECU and a response pending (NRC \$78) from a second ECU.
Set Up:	The DUT and ECUSIM shall be in the "ISO 15765 (29-bit, 500K, 2 ECUs) Initialized State", which is detailed in 5.4.3.10.
Procedure:	
<u>ACTION- DUT</u>	Initiate the request for SID \$04 (Clear DTCs).
<u>EVALUATION</u>	Pass if the 15765_29_SID\$04 message was transmitted.
<u>ACTION- ECUSIM</u>	After the <i>P2_MIN</i> delay, transmit the message 15765_29_ECU1_SID\$04_NRC78 , delay <i>P2_MIN</i> , then transmit the message 15765_29_ECU2_SID\$04_DONE .
<u>EVALUATION</u>	Pass if the transmission is successful.
<u>ACTION- ECUSIM</u>	After the <i>P2_78</i> delay, transmit the message 15765_29_ECU1_SID\$04_DONE
<u>EVALUATION</u>	Pass if the transmission is successful and the DUT indicates that DTCs have been cleared.

Figure 86 - Verify an ISO 15765-4 SID \$04 clear codes request with NRC=\$78 (29-bit, 500K)

9.2.29 Verify a SID \$06 MID Supported MID Request (11-bit, 500K; 1 ECU)

Test ID:	\$30106000
Purpose:	The purpose of this test is to verify that the DUT can correctly request SID \$06 MID Supported MIDs.
Rationale:	This test will use a positive response from a single ECU.
Set Up:	The DUT and ECUSIM shall be in the “ISO 15765 (11-bit, 500K, 2 ECUs) Initialized State”, which is detailed in 5.4.3.9.
Procedure:	
<u>ACTION- DUT</u>	Initiate the request for SID \$06 MID \$00 (MID Supported MIDs).
<u>EVALUATION</u>	Pass if the 15765_11_SID\$06_MID\$00 message was transmitted.
<u>ACTION- ECUSIM</u>	After the <i>P2_MIN</i> delay, transmit the message 15765_11_ECU1_SID\$06_MID\$00 .
<u>EVALUATION</u>	Pass if the transmission is successful and the DUT indicates that ECU #1 supports MIDs \$01, \$02, \$05, and \$06.

Figure 87 - Verify an ISO 15765-4 SID \$06 MID supported MID request (11-bit, 500K)

9.2.30 Verify a SID \$06 MID Supported MID Request (29-bit, 500K; 1 ECU)

Test ID:	\$30106001
Purpose:	The purpose of this test is to verify that the DUT can correctly request SID \$06 MID Supported MIDs.
Rationale:	This test will use a positive response from a single ECU.
Set Up:	The DUT and ECUSIM shall be in the “ISO 15765 (29-bit, 500K, 2 ECUs) Initialized State”, which is detailed in 5.4.3.10.
Procedure:	
<u>ACTION- DUT</u>	Initiate the request for SID \$06 MID \$00 (MID Supported MIDs).
<u>EVALUATION</u>	Pass if the 15765_29_SID\$06_MID\$00 message was transmitted.
<u>ACTION- ECUSIM</u>	After the <i>P2_MIN</i> delay, transmit the message 15765_29_ECU1_SID\$06_MID\$00 .
<u>EVALUATION</u>	Pass if the transmission is successful and the DUT indicates that ECU #1 supports MIDs \$01, \$02, \$05, and \$06.

Figure 88 - Verify an ISO 15765-4 SID \$06 MID supported MID request (29-bit, 500K)

9.2.31 Verify a SID \$07 Pending DTC Request with No DTCs (11-bit, 500K; 2 ECUs w/ Order Swap)

Test ID:	\$30107000
Purpose:	The purpose of this test is to verify that the DUT can correctly request SID \$07 and process a 'no DTCs present' response.
Rationale:	This test will use positive responses from two different ECUs. The order of ECU responses will be different than that of the original connection order.
Set Up:	The DUT and ECUSIM shall be in the "ISO 15765 (11-bit, 500K, 2 ECUs) Initialized State", which is detailed in 5.4.3.9.
Procedure:	
<u>ACTION- DUT</u>	Initiate the request for SID \$07 (Pending DTCs).
<u>EVALUATION</u>	Pass if the 15765_11_SID\$07 message was transmitted.
<u>ACTION- ECUSIM</u>	After the <i>P2_MIN</i> delay, transmit the message 15765_11_ECU2_SID\$07_NoDTC , delay <i>P2_MIN</i> , then transmit the message 15765_11_ECU1_SID\$07_NoDTC .
<u>EVALUATION</u>	Pass if transmission is successful and the DUT indicates that there are no pending DTCs in either ECU.

Figure 89 - Verify an ISO 15765-4 SID \$07 pending DTC request with no DTCs (11-bit, 500K)

9.2.32 Verify a SID \$07 Pending DTC Request with No DTCs (29-bit, 500K; 2 ECUs w/ Order Swap)

Test ID:	\$30107001
Purpose:	The purpose of this test is to verify that the DUT can correctly request SID \$07 and process a 'no DTCs present' response.
Rationale:	This test will use positive responses from two different ECUs. The order of ECU responses will be different than that of the original connection order.
Set Up:	The DUT and ECUSIM shall be in the "ISO 15765 (29-bit, 500K, 2 ECUs) Initialized State", which is detailed in 5.4.3.10.
Procedure:	
<u>ACTION- DUT</u>	Initiate the request for SID \$07 (Pending DTCs).
<u>EVALUATION</u>	Pass if the 15765_29_SID\$07 message was transmitted.
<u>ACTION- ECUSIM</u>	After the <i>P2_MIN</i> delay, transmit the message 15765_29_ECU2_SID\$07_NoDTC , delay <i>P2_MIN</i> , then transmit the message 15765_29_ECU1_SID\$07_NoDTC .
<u>EVALUATION</u>	Pass if transmission is successful and the DUT indicates that there are no pending DTCs in either ECU.

Figure 90 - Verify an ISO 15765-4 SID \$07 pending DTC request with no DTCs (29-bit, 500K)

9.2.33 Verify a SID \$07 Pending DTC Request with DTCs (11-bit, 500K; 2 ECUs)

Test ID:	\$30107002
Purpose:	The purpose of this test is to verify that the DUT can correctly request SID \$07 and process a 'DTCs present' response.
Rationale:	This test will use positive responses from two different ECUs.
Set Up:	The DUT and ECUSIM shall be in the "ISO 15765 (11-bit, 500K, 2 ECUs) Initialized State", which is detailed in 5.4.3.9.
Procedure:	
<u>ACTION- DUT</u>	Initiate the request for SID \$07 (Pending DTCs).
<u>EVALUATION</u>	Pass if the 15765_11_SID\$07 message was transmitted.
<u>ACTION- ECUSIM</u>	After the <i>P2_MIN</i> delay, transmit the message 15765_11_ECU1_SID\$07_DTC , delay <i>P2_MIN</i> , then transmit the message 15765_11_ECU2_SID\$07_NoDTC .
<u>EVALUATION</u>	Pass if the following is true: The transmission is successful. The DUT indicates that ECU #1 has the following pending DTCs: P0107, P0110, P0115, and P0124. The DUT indicates that ECU #2 has no pending DTCs.

Figure 91 - Verify an ISO 15765-4 SID \$07 pending DTC request with DTCs (11-bit, 500K)

9.2.34 Verify a SID \$07 Pending DTC Request with DTCs (29-bit, 500K; 2 ECUs)

Test ID:	\$30107003
Purpose:	The purpose of this test is to verify that the DUT can correctly request SID \$07 and process a 'DTCs present' response.
Rationale:	This test will use positive responses from two different ECUs.
Set Up:	The DUT and ECUSIM shall be in the "ISO 15765 (29-bit, 500K, 2 ECUs) Initialized State", which is detailed in 5.4.3.10.
Procedure:	
<u>ACTION- DUT</u>	Initiate the request for SID \$07 (Pending DTCs).
<u>EVALUATION</u>	Pass if the 15765_29_SID\$07 message was transmitted.
<u>ACTION- ECUSIM</u>	After the <i>P2_MIN</i> delay, transmit the message 15765_29_ECU1_SID\$07_DTC , delay <i>P2_MIN</i> , then transmit the message 15765_29_ECU2_SID\$07_NoDTC .
<u>EVALUATION</u>	Pass if the following is true: The transmission is successful. The DUT indicates that ECU #1 has the following pending DTCs: P0107, P0110, P0115, and P0124. The DUT indicates that ECU #2 has no pending DTCs.

Figure 92 - Verify an ISO 15765-4 SID \$07 pending DTC request with DTCs (29-bit, 500K)

9.2.35 Verify a SID \$08 TID Supported TID Request (11-bit, 500K; 1 ECU)

Test ID:	\$30108000
Purpose:	The purpose of this test is to verify that the DUT can correctly request SID \$08 TID Supported TIDs.
Rationale:	This test will use a positive response from a single ECU.
Set Up:	The DUT and ECUSIM shall be in the “ISO 15765 (11-bit, 500K, 2 ECUs) Initialized State”, which is detailed in 5.4.3.9.
Procedure:	
<u>ACTION- DUT</u>	Initiate the request for SID \$08 TID \$00 (TID Supported TIDs).
<u>EVALUATION</u>	Pass if the 15765_11_SID\$08_PID\$00 message was transmitted.
<u>ACTION- ECUSIM</u>	After the <i>P2_MIN</i> delay, transmit the message 15765_11_ECU1_SID\$08_PID\$00 .
<u>EVALUATION</u>	Pass if the transmission is successful and the DUT indicates that ECU #1 supports TID \$01 (the leak test).

Figure 93 - Verify an ISO 15765-4 SID \$08 TID supported TID request (11-bit, 500K)

9.2.36 Verify a SID \$08 TID Supported TID Request (29-bit, 500K; 1 ECU)

Test ID:	\$30108001
Purpose:	The purpose of this test is to verify that the DUT can correctly request SID \$08 TID Supported TIDs.
Rationale:	This test will use a positive response from a single ECU.
Set Up:	The DUT and ECUSIM shall be in the “ISO 15765 (29-bit, 500K, 2 ECUs) Initialized State”, which is detailed in 5.4.3.10.
Procedure:	
<u>ACTION- DUT</u>	Initiate the request for SID \$08 TID \$00 (TID Supported TIDs).
<u>EVALUATION</u>	Pass if the 15765_29_SID\$08_PID\$00 message was transmitted.
<u>ACTION- ECUSIM</u>	After the <i>P2_MIN</i> delay, transmit the message 15765_29_ECU1_SID\$08_PID\$00 .
<u>EVALUATION</u>	Pass if the transmission is successful and the DUT indicates that ECU #1 supports TID \$01 (the leak test).

Figure 94 - Verify an ISO 15765-4 SID \$08 TID supported TID request (29-bit, 500K)

9.2.37 Verify a SID \$09 INF Supported INF Request (11-bit, 500K; 2 ECUs w/ Order Swap)

Test ID:	\$30109000
Purpose:	The purpose of this test is to verify that the DUT can correctly request SID \$09 INF Supported INFs.
Rationale:	This test will use positive responses from two different ECUs. The order of ECU responses will be different than that of the original connection order.
Set Up:	The DUT and ECUSIM shall be in the "ISO 15765 (11-bit, 500K, 2 ECUs) Initialized State", which is detailed in 5.4.3.9.
Procedure:	
<u>ACTION- DUT</u>	Initiate the request for SID \$09 INF \$00 (INF Supported INFs).
<u>EVALUATION</u>	Pass if the 15765_11_SID\$09_PID\$00 message was transmitted.
<u>ACTION- ECUSIM</u>	After the <i>P2_MIN</i> delay, transmit the message 15765_11_ECU2_SID\$09_INF\$00 , delay <i>P2_MIN</i> , then transmit the message 15765_11_ECU1_SID\$09_INF\$00 .
<u>EVALUATION</u>	Pass if the transmission is successful and the DUT indicates that ECU #1 supports INF \$02 (VIN), INF \$04 (CALID), INF \$06 (CVN), INF \$08 (IPT), and INF \$0A (ECU Name) while ECU #2 supports INF \$04 (CALID), INF \$06 (CVN), and INF \$0A (ECU Name).

Figure 95 - Verify an ISO 15765-4 SID \$09 INF supported INF request (11-bit, 500K)

9.2.38 Verify a SID \$09 INF Supported INF Request Diesel (11-bit, 500K; 2 ECUs w/ Order Swap)

Test ID:	\$30109001
Purpose:	The purpose of this test is to verify that the DUT can correctly request SID \$09 INF Supported INFs.
Rationale:	This test will use positive responses from two different ECUs. The order of ECU responses will be different than that of the original connection order.
Set Up:	The DUT and ECUSIM shall be in the "ISO 15765 (11-bit, 500K, 2 ECUs) Initialized State", which is detailed in 5.4.3.9.
Procedure:	
<u>ACTION- DUT</u>	Initiate the request for SID \$09 INF \$00 (INF Supported INFs).
<u>EVALUATION</u>	Pass if the 15765_11_SID\$09_PID\$00 message was transmitted.
<u>ACTION- ECUSIM</u>	After the <i>P2_MIN</i> delay, transmit the message 15765_11_ECU2_SID\$09_INF\$00_DIESEL , delay <i>P2_MIN</i> , then transmit the message 15765_11_ECU1_SID\$09_INF\$00_DIESEL .
<u>EVALUATION</u>	Pass if the transmission is successful and the DUT indicates that ECU #1 supports INF \$02 (VIN), INF \$04 (CALID), INF \$06 (CVN), INF \$0A (ECU Name), INF \$0B (IPT), INF \$0D (ESN), and INF \$0F (EROTAN) while ECU #2 supports INF \$04 (CALID), INF \$06 (CVN), INF \$0A (ECU Name), INF \$0B (IPT), INF \$0D (ESN), and INF \$0F (EROTAN).

Figure 96 - Verify an ISO 15765-4 SID \$09 INF supported INF request (11-bit, 500K)

9.2.39 Verify a SID \$09 INF Supported INF Request (29-bit, 500K; 2 ECUs w/ Order Swap)

Test ID:	\$30109002
Purpose:	The purpose of this test is to verify that the DUT can correctly request SID \$09 INF Supported INFs.
Rationale:	This test will use positive responses from two different ECUs. The order of ECU responses will be different than that of the original connection order.
Set Up:	The DUT and ECUSIM shall be in the "ISO 15765 (29-bit, 500K, 2 ECUs) Initialized State", which is detailed in 5.4.3.10.
Procedure:	
<u>ACTION- DUT</u>	Initiate the request for SID \$09 INF \$00 (INF Supported INFs).
<u>EVALUATION</u>	Pass if the 15765_29_SID\$09_PID\$00 message was transmitted.
<u>ACTION- ECUSIM</u>	After the <i>P2_MIN</i> delay, transmit the message 15765_29_ECU2_SID\$09_INF\$00 , delay <i>P2_MIN</i> , then transmit the message 15765_29_ECU1_SID\$09_INF\$00 .
<u>EVALUATION</u>	Pass if the transmission is successful and the DUT indicates that: ECU #1 supports INF \$02 (VIN), INF \$04 (CALID), INF \$06 (CVN), INF \$08 (IPT), and INF \$0A (ECU Name) ECU #2 supports INF \$04 (CALID), INF \$06 (CVN), and INF \$0A (ECU Name).

Figure 97 - Verify an ISO 15765-4 SID \$09 INF supported INF request (29-bit, 500K)

9.2.40 Verify a SID \$09 INF Supported INF Request Diesel (29-bit, 500K; 2 ECUs w/ Order Swap)

Test ID:	\$30109003
Purpose:	The purpose of this test is to verify that the DUT can correctly request SID \$09 INF Supported INFs.
Rationale:	This test will use positive responses from two different ECUs. The order of ECU responses will be different than that of the original connection order.
Set Up:	The DUT and ECUSIM shall be in the "ISO 15765 (29-bit, 500K, 2 ECUs) Initialized State", which is detailed in 5.4.3.10.
Procedure:	
<u>ACTION- DUT</u>	Initiate the request for SID \$09 INF \$00 (INF Supported INFs).
<u>EVALUATION</u>	Pass if the 15765_29_SID\$09_PID\$00 message was transmitted.
<u>ACTION- ECUSIM</u>	After the <i>P2_MIN</i> delay, transmit the message 15765_29_ECU2_SID\$09_INF\$00_DIESEL , delay <i>P2_MIN</i> , then transmit the message 15765_29_ECU1_SID\$09_INF\$00_DIESEL .
<u>EVALUATION</u>	Pass if the transmission is successful and the DUT indicates that: ECU #1 supports INF \$02 (VIN), INF \$04 (CALID), INF \$06 (CVN), INF \$0A (ECU Name), INF \$0B (IPT), INF \$0D (ESN), and INF \$0F (EROTAN) ECU #2 supports INF \$04 (CALID), INF \$06 (CVN), INF \$0A (ECU Name), INF \$0B (IPT), INF \$0D (ESN), and INF \$0F (EROTAN).

Figure 98 - Verify an ISO 15765-4 SID \$09 INF supported INF request (29-bit, 500K)

9.2.41 Verify a SID \$09 INF Supported INF Request (11-bit, 500K; 8 ECUs w/ Order Swap)

Test ID:	\$30109004
Purpose:	The purpose of this test is to verify that the DUT can correctly request SID \$09 INF Supported INFs.
Rationale:	This test will use positive responses from eight different ECUs. The order of ECU responses will be different than that of the original connection order.
Set Up:	The DUT and ECUSIM shall be in the “ISO 15765 (11-bit, 500K, 8 ECUs) Initialized State”, which is detailed in 5.4.3.11.
Procedure:	
<u>ACTION- DUT</u>	Initiate the request for SID \$09 INF \$00 (INF Supported INFs).
<u>EVALUATION</u>	Pass if the 15765_11_SID\$09_PID\$00 message was transmitted.
<u>ACTION- ECUSIM</u>	Delay <i>P2_MIN</i> before transmitting each of the following messages 15765_11_ECU5_SID\$09_INF\$00, 15765_11_ECU2_SID\$09_INF\$00, 15765_11_ECU6_SID\$09_INF\$00, 15765_11_ECU3_SID\$09_INF\$00, 15765_11_ECU7_SID\$09_INF\$00, 15765_11_ECU4_SID\$09_INF\$00, 15765_11_ECU1_SID\$09_INF\$00 and 15765_11_ECU8_SID\$09_INF\$00.
<u>EVALUATION</u>	Pass if the transmission is successful and the DUT indicates that: ECU #1 supports INF \$02 (VIN), INF \$04 (CALID), INF \$06 (CVN), INF \$08 (IPT), and INF \$0A (ECU Name). ECU #2 supports INF \$04 (CALID), INF \$06 (CVN), and INF \$0A (ECU Name). ECU #3 supports INF \$04 (CALID), INF \$06 (CVN), and INF \$0A (ECU Name). ECU #4 supports INF \$04 (CALID), INF \$06 (CVN), and INF \$0A (ECU Name). ECU #5 supports INF \$04 (CALID), INF \$06 (CVN), and INF \$0A (ECU Name). ECU #6 supports INF \$04 (CALID), INF \$06 (CVN), and INF \$0A (ECU Name). ECU #7 supports INF \$04 (CALID), INF \$06 (CVN), and INF \$0A (ECU Name). ECU #8 supports INF \$04 (CALID), INF \$06 (CVN), and INF \$0A (ECU Name).

Figure 99 - Verify an ISO 15765-4 SID \$09 INF supported INF request (11-bit, 500K)

9.2.42 Verify a SID \$09 INF Supported INF Request Diesel (11-bit, 500K; 8 ECUs w/ Order Swap)

Test ID:	\$30109005
Purpose:	The purpose of this test is to verify that the DUT can correctly request SID \$09 INF Supported INFs.
Rationale:	This test will use positive responses from eight different ECUs. The order of ECU responses will be different than that of the original connection order.
Set Up:	The DUT and ECUSIM shall be in the “ISO 15765 (11-bit, 500K, 8 ECUs) Initialized State”, which is detailed in 5.4.3.11.
Procedure:	
<u>ACTION- DUT</u>	Initiate the request for SID \$09 INF \$00 (INF Supported INFs).
<u>EVALUATION</u>	Pass if the 15765_11_SID\$09_PID\$00 message was transmitted.
<u>ACTION- ECUSIM</u>	Delay <i>P2_MIN</i> before transmitting each of the following messages 15765_11_ECU5_SID\$09_INF\$00_DIESEL, 15765_11_ECU2_SID\$09_INF\$00_DIESEL, 15765_11_ECU6_SID\$09_INF\$00_DIESEL, 15765_11_ECU3_SID\$09_INF\$00_DIESEL, 15765_11_ECU7_SID\$09_INF\$00_DIESEL, 15765_11_ECU4_SID\$09_INF\$00_DIESEL, 15765_11_ECU1_SID\$09_INF\$00_DIESEL and 15765_11_ECU8_SID\$09_INF\$00_DIESEL.
<u>EVALUATION</u>	Pass if the transmission is successful and the DUT indicates that: ECU #1 supports INF \$02 (VIN), INF \$04 (CALID), INF \$06 (CVN), INF \$0A (ECU Name), INF \$0B (IPT), INF \$0D (ESN), and INF \$0F (EROTAN). ECU #2 supports INF \$04 (CALID), INF \$06 (CVN), INF \$0A (ECU Name), INF \$0B (IPT), INF \$0D (ESN), and INF \$0F (EROTAN). ECU #3 supports INF \$04 (CALID), INF \$06 (CVN), INF \$0A (ECU Name), INF \$0B (IPT), INF \$0D (ESN), and INF \$0F (EROTAN). ECU #4 supports INF \$04 (CALID), INF \$06 (CVN), INF \$0A (ECU Name), INF \$0B (IPT), INF \$0D (ESN), and INF \$0F (EROTAN). ECU #5 supports INF \$04 (CALID), INF \$06 (CVN), INF \$0A (ECU Name), INF \$0B (IPT), INF \$0D (ESN), and INF \$0F (EROTAN). ECU #6 supports INF \$04 (CALID), INF \$06 (CVN), INF \$0A (ECU Name), INF \$0B (IPT), INF \$0D (ESN), and INF \$0F (EROTAN). ECU #7 supports INF \$04 (CALID), INF \$06 (CVN), INF \$0A (ECU Name), INF \$0B (IPT), INF \$0D (ESN), and INF \$0F (EROTAN). ECU #8 supports INF \$04 (CALID), INF \$06 (CVN), INF \$0A (ECU Name), INF \$0B (IPT), INF \$0D (ESN), and INF \$0F (EROTAN).

Figure 100 - Verify an ISO 15765-4 SID \$09 INF supported INF request (11-bit, 500K)

9.2.43 Verify a SID \$09 INF Supported INF Request (29-bit, 500K; 8 ECUs w/ Order Swap)

Test ID:	\$30109006
Purpose:	The purpose of this test is to verify that the DUT can correctly request SID \$09 INF Supported INFs.
Rationale:	This test will use positive responses from eight different ECUs. The order of ECU responses will be different than that of the original connection order.
Set Up:	The DUT and ECUSIM shall be in the "ISO 15765 (29-bit, 500K, 8 ECUs) Initialized State", which is detailed in 5.4.3.12.
Procedure:	
<u>ACTION- DUT</u>	Initiate the request for SID \$09 INF \$00 (INF Supported INFs).
<u>EVALUATION</u>	Pass if the 15765_29_SID\$09_PID\$00 message was transmitted.
<u>ACTION- ECUSIM</u>	Delay <i>P2_MIN</i> before transmitting each of the following messages 15765_29_ECU5_SID\$09_INF\$00, 15765_29_ECU2_SID\$09_INF\$00, 15765_29_ECU6_SID\$09_INF\$00, 15765_29_ECU3_SID\$09_INF\$00, 15765_29_ECU7_SID\$09_INF\$00, 15765_29_ECU4_SID\$09_INF\$00, 15765_29_ECU1_SID\$09_INF\$00 and 15765_29_ECU8_SID\$09_INF\$00.
<u>EVALUATION</u>	Pass if the transmission is successful and the DUT indicates that: ECU #1 supports INF \$02 (VIN), INF \$04 (CALID), INF \$06 (CVN), INF \$08 (IPT), and INF \$0A (ECU Name). ECU #2 supports INF \$04 (CALID), INF \$06 (CVN), and INF \$0A (ECU Name). ECU #3 supports INF \$04 (CALID), INF \$06 (CVN), and INF \$0A (ECU Name). ECU #4 supports INF \$04 (CALID), INF \$06 (CVN), and INF \$0A (ECU Name). ECU #5 supports INF \$04 (CALID), INF \$06 (CVN), and INF \$0A (ECU Name). ECU #6 supports INF \$04 (CALID), INF \$06 (CVN), and INF \$0A (ECU Name). ECU #7 supports INF \$04 (CALID), INF \$06 (CVN), and INF \$0A (ECU Name). ECU #8 supports INF \$04 (CALID), INF \$06 (CVN), and INF \$0A (ECU Name).

Figure 101 - Verify an ISO 15765-4 SID \$09 INF supported INF request (29-bit, 500K)

9.2.44 Verify a SID \$09 INF Supported INF Request Diesel (29-bit, 500K; 8 ECUs w/ Order Swap)

Test ID:	\$30109007
Purpose:	The purpose of this test is to verify that the DUT can correctly request SID \$09 INF Supported INFs.
Rationale:	This test will use positive responses from eight different ECUs. The order of ECU responses will be different than that of the original connection order.
Set Up:	The DUT and ECUSIM shall be in the "ISO 15765 (29-bit, 500K, 8 ECUs) Initialized State", which is detailed in 5.4.3.12.
Procedure:	
<u>ACTION- DUT</u>	Initiate the request for SID \$09 INF \$00 (INF Supported INFs).
<u>EVALUATION</u>	Pass if the 15765_29_SID\$09_PID\$00 message was transmitted.
<u>ACTION- ECUSIM</u>	Delay <i>P2_MIN</i> before transmitting each of the following messages 15765_29_ECU5_SID\$09_INF\$00_DIESEL, 15765_29_ECU2_SID\$09_INF\$00_DIESEL, 15765_29_ECU6_SID\$09_INF\$00_DIESEL, 15765_29_ECU3_SID\$09_INF\$00_DIESEL, 15765_29_ECU7_SID\$09_INF\$00_DIESEL, 15765_29_ECU4_SID\$09_INF\$00_DIESEL, 15765_29_ECU1_SID\$09_INF\$00_DIESEL and 15765_29_ECU8_SID\$09_INF\$00_DIESEL.
<u>EVALUATION</u>	Pass if the transmission is successful and the DUT indicates that: ECU #1 supports INF \$02 (VIN), INF \$04 (CALID), INF \$06 (CVN), INF \$0A (ECU Name), INF \$0B (IPT), INF \$0D (ESN), and INF \$0F (EROTAN). ECU #2 supports INF \$04 (CALID), INF \$06 (CVN), INF \$0A (ECU Name), INF \$0B (IPT), INF \$0D (ESN), and INF \$0F (EROTAN). ECU #3 supports INF \$04 (CALID), INF \$06 (CVN), INF \$0A (ECU Name), INF \$0B (IPT), INF \$0D (ESN), and INF \$0F (EROTAN). ECU #4 supports INF \$04 (CALID), INF \$06 (CVN), INF \$0A (ECU Name), INF \$0B (IPT), INF \$0D (ESN), and INF \$0F (EROTAN). ECU #5 supports INF \$04 (CALID), INF \$06 (CVN), INF \$0A (ECU Name), INF \$0B (IPT), INF \$0D (ESN), and INF \$0F (EROTAN). ECU #6 supports INF \$04 (CALID), INF \$06 (CVN), INF \$0A (ECU Name), INF \$0B (IPT), INF \$0D (ESN), and INF \$0F (EROTAN). ECU #7 supports INF \$04 (CALID), INF \$06 (CVN), INF \$0A (ECU Name), INF \$0B (IPT), INF \$0D (ESN), and INF \$0F (EROTAN). ECU #8 supports INF \$04 (CALID), INF \$06 (CVN), INF \$0A (ECU Name), INF \$0B (IPT), INF \$0D (ESN), and INF \$0F (EROTAN).

Figure 102 - Verify an ISO 15765-4 SID \$09 INF supported INF request (29-bit, 500K)

9.2.45 Verify a SID \$09 VIN Request (11-bit, 500K; 1 ECU)

Test ID:	\$30109008
Purpose:	The purpose of this test is to verify that the DUT can correctly request SID \$09 INF \$02.
Rationale:	This test will use a positive response from a single ECU.
Set Up:	The DUT and ECUSIM shall be in the “ISO 15765 (11-bit, 500K, 2 ECUs) SID9 Ready State”, which is detailed in 5.4.3.13.
Procedure:	
<u>ACTION- DUT</u>	Initiate the request for SID \$09 INF \$02 (VIN).
<u>EVALUATION</u>	Pass if the 15765_11_SID\$09_INF\$02 message was transmitted.
<u>ACTION- ECUSIM</u>	After the <i>P2_MIN</i> delay, transmit the message 15765_11_ECU1_SID\$09_INF\$02 .
<u>EVALUATION</u>	Pass if the transmission is successful and the DUT indicates that VIN is 1GYDE63A7A0000000.

Figure 103 - Verify an ISO 15765-4 SID \$09 VIN request (11-bit, 500K)

9.2.46 Verify a SID \$09 VIN Request (29-bit, 500K; 1 ECU)

Test ID:	\$30109009
Purpose:	The purpose of this test is to verify that the DUT can correctly request SID \$09 INF \$02.
Rationale:	This test will use a positive response from a single ECU.
Set Up:	The DUT and ECUSIM shall be in the “ISO 15765 (29-bit, 500K, 2 ECUs) SID9 Ready State”, which is detailed in 5.4.3.15.
Procedure:	
<u>ACTION- DUT</u>	Initiate the request for SID \$09 INF \$02 (VIN).
<u>EVALUATION</u>	Pass if the 15765_29_SID\$09_INF\$02 message was transmitted.
<u>ACTION- ECUSIM</u>	After the <i>P2_MIN</i> delay, transmit the message 15765_29_ECU1_SID\$09_INF\$02 .
<u>EVALUATION</u>	Pass if the transmission is successful and the DUT indicates that VIN is 1GYDE63A7A0000000.

Figure 104 - Verify an ISO 15765-4 SID \$09 VIN request (29-bit, 500K)

9.2.47 Verify a SID \$09 VIN Request with NRC=\$78 (11-bit, 500K; 1 ECU)

Test ID:	\$3010900A
Purpose:	The purpose of this test is to verify that the DUT can correctly request SID \$09 INF \$02 when the ECU has an initial NRC = \$78.
Rationale:	This test will use a response pending (NRC \$78) from a single ECU.
Set Up:	The DUT and ECUSIM shall be in the "ISO 15765 (11-bit, 500K, 2 ECUs) SID9 Ready State", which is detailed in 5.4.3.13.
Procedure:	
<u>ACTION- DUT</u>	Initiate the request for SID \$09 INF \$02 (VIN).
<u>EVALUATION</u>	Pass if the 15765_11_SID\$09_INF\$02 message was transmitted.
<u>ACTION- ECUSIM</u>	After the <i>P2_MIN</i> delay, transmit the message 15765_11_ECU1_SID\$09_NRC78 .
<u>EVALUATION</u>	Pass if the 15765_11_ECU1_SID\$09_NRC78 message was transmitted.
<u>ACTION- ECUSIM</u>	After the <i>P2_MIN</i> delay, transmit the message 15765_11_ECU1_SID\$09_INF\$02 .
<u>EVALUATION</u>	Pass if the transmission is successful and the DUT indicates that VIN is 1GYDE63A7A0000000.

Figure 105 - Verify an ISO 15765-4 SID \$09 VIN request with NRC=\$78 (11-bit, 500K)

9.2.48 Verify a SID \$09 VIN Request with NRC=\$78 (29-bit, 500K; 1 ECU)

Test ID:	\$3010900B
Purpose:	The purpose of this test is to verify that the DUT can correctly request SID \$09 INF \$02 when the ECU has an initial NRC = \$78.
Rationale:	This test will use a response pending (NRC \$78) from a single ECU.
Set Up:	The DUT and ECUSIM shall be in the "ISO 15765 (29-bit, 500K, 2 ECUs) SID9 Ready State", which is detailed in 5.4.3.15.
Procedure:	
<u>ACTION- DUT</u>	Initiate the request for SID \$09 INF \$02 (VIN).
<u>EVALUATION</u>	Pass if the 15765_29_SID\$09_INF\$02 message was transmitted.
<u>ACTION- ECUSIM</u>	After the <i>P2_MIN</i> delay, transmit the message 15765_29_ECU1_SID\$09_NRC78 .
<u>EVALUATION</u>	Pass if the 15765_29_ECU1_SID\$09_NRC78 message was transmitted.
<u>ACTION- ECUSIM</u>	After the <i>P2_MIN</i> delay, transmit the message 15765_29_ECU1_SID\$09_INF\$02 .
<u>EVALUATION</u>	Pass if the transmission is successful and the DUT indicates that VIN is 1GYDE63A7A0000000.

Figure 106 - Verify an ISO 15765-4 SID \$09 VIN request with NRC=\$78 (29-bit, 500K)

9.2.49 Verify a SID \$09 CALID Request (11-bit, 500K; 2 ECUs w/ Order Swap)

Test ID:	\$3010900C
Purpose:	The purpose of this test is to verify that the DUT can correctly request SID \$09 INF \$04.
Rationale:	This test will use positive responses from two different ECUs. The order of ECU responses will be different than that of the original connection order.
Set Up:	The DUT and ECUSIM shall be in the "ISO 15765 (11-bit, 500K, 2 ECUs) SID9 Ready State", which is detailed in 5.4.3.13.
Procedure:	
<u>ACTION- DUT</u>	Initiate the request for SID \$09 INF \$04 (CALID).
<u>EVALUATION</u>	Pass if the 15765_11_SID\$09_INF\$04 message was transmitted.
<u>ACTION- ECUSIM</u>	After the <i>P2_MIN</i> delay, transmit the message 15765_11_ECU2_SID\$09_INF\$04 , delay <i>P2_MIN</i> , then transmit the message 15765_11_ECU1_SID\$09_INF\$04 .
<u>EVALUATION</u>	Pass if the transmission is successful and the DUT indicates that the CALID for ECU #1 is 12589772 while CALID for ECU #2 is 24221419.

Figure 107 - Verify an ISO 15765-4 SID \$09 CALID request (11-bit, 500K)

9.2.50 Verify a SID \$09 CALID Request (29-bit, 500K; 2 ECUs w/ Order Swap)

Test ID:	\$3010900D
Purpose:	The purpose of this test is to verify that the DUT can correctly request SID \$09 INF \$04.
Rationale:	This test will use positive responses from two different ECUs. The order of ECU responses will be different than that of the original connection order.
Set Up:	The DUT and ECUSIM shall be in the "ISO 15765 (29-bit, 500K, 2 ECUs) SID9 Ready State", which is detailed in 5.4.3.15.
Procedure:	
<u>ACTION- DUT</u>	Initiate the request for SID \$09 INF \$04 (CALID).
<u>EVALUATION</u>	Pass if the 15765_29_SID\$09_INF\$04 message was transmitted.
<u>ACTION- ECUSIM</u>	After the <i>P2_MIN</i> delay, transmit the message 15765_29_ECU2_SID\$09_INF\$04 , delay <i>P2_MIN</i> , then transmit the message 15765_29_ECU1_SID\$09_INF\$04 .
<u>EVALUATION</u>	Pass if the transmission is successful and the DUT indicates that the CALID for ECU #1 is 12589772 while CALID for ECU #2 is 24221419.

Figure 108 - Verify an ISO 15765-4 SID \$09 CALID request (29-bit, 500K)

9.2.51 Verify a SID \$09 CALID Request with 9 CALIDs (11-bit, 500K; 8 ECUs w/ Order Swap)

Test ID:	\$3010900E
Purpose:	The purpose of this test is to verify that the DUT can correctly request SID \$09 INF \$04 when 8 ECUs respond with 9 CALIDs each.
Rationale:	This test will use positive responses from eight different ECUs. The order of ECU responses will be different than that of the original connection order with ECU3 through ECU8 indicating that no SID \$01 PIDs are supported.
Set Up:	The DUT and ECUSIM shall be in the "ISO 15765 (11-bit, 500K, 8 ECUs) SID9 Ready State", which is detailed in 5.4.3.17.
Procedure:	
<u>ACTION- DUT</u>	Initiate the request for SID \$09 INF \$04 (CALID).
<u>EVALUATION</u>	Pass if the 15765_11_SID\$09_INF\$04 message was transmitted.
<u>ACTION- ECUSIM</u>	Delay <i>P2_MIN</i> before transmitting each of the following messages 15765_11_ECU5_SID\$09_INF\$04_9, 15765_11_ECU2_SID\$09_INF\$04_9, 15765_11_ECU6_SID\$09_INF\$04_9, 15765_11_ECU3_SID\$09_INF\$04_9, 15765_11_ECU7_SID\$09_INF\$04_9, 15765_11_ECU4_SID\$09_INF\$04_9, 15765_11_ECU1_SID\$09_INF\$04_9, 15765_11_ECU8_SID\$09_INF\$04_9.
<u>EVALUATION</u>	Pass if the following is true: Transmission is successful. The DUT indicates that the CALID for ECU #1 are: "11589778", "21589777", "31589776", "41589775", "51589774", "61589773", "71589772", "81589771", "91589770". The DUT indicates that the CALID for ECU #2 are: "12589778", "22589777", "32589776", "42589775", "52589774", "62589773", "72589772", "82589771", "92589770". The DUT indicates that the CALID for ECU #3 are: "13589778", "23589777", "33589776", "43589775", "53589774", "63589773", "73589772", "83589771", "93589770". The DUT indicates that the CALID for ECU #4 are: "14589778", "24589777", "34589776", "44589775", "54589774", "64589773", "74589772", "84589771", "94589770". The DUT indicates that the CALID for ECU #5 are: "15589778", "25589777", "35589776", "45589775", "55589774", "65589773", "75589772", "85589771", "95589770". The DUT indicates that the CALID for ECU #6 are: "16589778", "26589777", "36589776", "46589775", "56589774", "66589773", "76589772", "86589771", "96589770". The DUT indicates that the CALID for ECU #7 are: "17589778", "27589777", "37589776", "47589775", "57589774", "67589773", "77589772", "87589771", "97589770". The DUT indicates that the CALID for ECU #8 are: "18589778", "28589777", "38589776", "48589775", "58589774", "68589773", "78589772", "88589771", "98589770".

Figure 109 - Verify an ISO 15765-4 SID \$09 CALID request with 9 CALIDs on an ECU (11-bit, 500K)

9.2.52 Verify a SID \$09 CALID Request with 9 CALIDs (29-bit, 500K; 8 ECUs w/ Order Swap)

Test ID:	\$3010900F
Purpose:	The purpose of this test is to verify that the DUT can correctly request SID \$09 INF \$04 when 8 ECUs responds with 9 CALIDs each.
Rationale:	This test will use positive responses from eight different ECUs. The order of ECU responses will be different than that of the original connection order with ECU3 through ECU8 indicating that no SID \$01 PIDs are supported.
Set Up:	The DUT and ECUSIM shall be in the "ISO 15765 (29-bit, 500K, 8 ECUs) SID9 Ready State", which is detailed in 5.4.3.19.
Procedure:	
<u>ACTION- DUT</u>	Initiate the request for SID \$09 INF \$04 (CALID).
<u>EVALUATION</u>	Pass if the 15765_29_SID\$09_INF\$04 message was transmitted.
<u>ACTION- ECUSIM</u>	Delay <i>P2_MIN</i> before transmitting each of the following messages 15765_29_ECU5_SID\$09_INF\$04_9, 15765_29_ECU2_SID\$09_INF\$04_9, 15765_29_ECU6_SID\$09_INF\$04_9, 15765_29_ECU3_SID\$09_INF\$04_9, 15765_29_ECU7_SID\$09_INF\$04_9, 15765_29_ECU4_SID\$09_INF\$04_9, 15765_29_ECU1_SID\$09_INF\$04_9, 15765_29_ECU8_SID\$09_INF\$04_9.
<u>EVALUATION</u>	Pass if the following is true: Transmission is successful. The DUT indicates that the CALID for ECU #1 are: "11589778", "21589777", "31589776", "41589775", "51589774", "61589773", "71589772", "81589771", "91589770". The DUT indicates that the CALID for ECU #2 are: "12589778", "22589777", "32589776", "42589775", "52589774", "62589773", "72589772", "82589771", "92589770". The DUT indicates that the CALID for ECU #3 are: "13589778", "23589777", "33589776", "43589775", "53589774", "63589773", "73589772", "83589771", "93589770". The DUT indicates that the CALID for ECU #4 are: "14589778", "24589777", "34589776", "44589775", "54589774", "64589773", "74589772", "84589771", "94589770". The DUT indicates that the CALID for ECU #5 are: "15589778", "25589777", "35589776", "45589775", "55589774", "65589773", "75589772", "85589771", "95589770". The DUT indicates that the CALID for ECU #6 are: "16589778", "26589777", "36589776", "46589775", "56589774", "66589773", "76589772", "86589771", "96589770". The DUT indicates that the CALID for ECU #7 are: "17589778", "27589777", "37589776", "47589775", "57589774", "67589773", "77589772", "87589771", "97589770". The DUT indicates that the CALID for ECU #8 are: "18589778", "28589777", "38589776", "48589775", "58589774", "68589773", "78589772", "88589771", "98589770".

Figure 110 - Verify an ISO 15765-4 SID \$09 CALID request with 9 CALIDs on an ECU (29-bit, 500K)

9.2.53 Verify a SID \$09 CVN Request (11-bit, 500K; 2 ECU w/ Order Swap)

Test ID:	\$30109010
Purpose:	The purpose of this test is to verify that the DUT can correctly request SID \$09 INF \$06 when 2 ECUs responds with 1 CVN each.
Rationale:	This test will use positive responses from two different ECUs. The order of ECU responses will be different than that of the original connection order.
Set Up:	The DUT and ECUSIM shall be in the "ISO 15765 (11-bit, 500K, 2 ECUs) SID9 Ready State", which is detailed in 5.4.3.13.
Procedure:	
<u>ACTION- DUT</u>	Initiate the request for SID \$09 INF \$06 (CVN).
<u>EVALUATION</u>	Pass if the 15765_11_SID\$09_INF\$06 message was transmitted.
<u>ACTION- ECUSIM</u>	After the <i>P2_MIN</i> delay, transmit the message 15765_11_ECU2_SID\$09_INF\$06 , delay <i>P2_MIN</i> , then transmit the message 15765_11_ECU1_SID\$09_INF\$06 .
<u>EVALUATION</u>	Pass if the transmission is successful and the DUT indicates that the CVN for ECU #1 is \$1791BC88 and the CVN for ECU #2 is \$2791BC88.

Figure 111 - Verify an ISO 15765-4 SID \$09 CVN request (11-bit, 500K)

9.2.54 Verify a SID \$09 CVN Request (29-bit, 500K; 2 ECU w/ Order Swap)

Test ID:	\$30109011
Purpose:	The purpose of this test is to verify that the DUT can correctly request SID \$09 INF \$06 when 2 ECUs responds with 1 CVN each.
Rationale:	This test will use positive responses from two different ECUs. The order of ECU responses will be different than that of the original connection order.
Set Up:	The DUT and ECUSIM shall be in the "ISO 15765 (29-bit, 500K, 2 ECUs) SID9 Ready State", which is detailed in 5.4.3.15.
Procedure:	
<u>ACTION- DUT</u>	Initiate the request for SID \$09 INF \$06 (CVN).
<u>EVALUATION</u>	Pass if the 15765_29_SID\$09_INF\$06 message was transmitted.
<u>ACTION- ECUSIM</u>	After the <i>P2_MIN</i> delay, transmit the message 15765_29_ECU2_SID\$09_INF\$06 , delay <i>P2_MIN</i> , then transmit the message 15765_29_ECU1_SID\$09_INF\$06 .
<u>EVALUATION</u>	Pass if the transmission is successful and the DUT indicates that the CVN for ECU #1 is \$1791BC88 and the CVN for ECU #2 is \$2791BC88.

Figure 112 - Verify an ISO 15765-4 SID \$09 CVN request (29-bit, 500K)

9.2.55 Verify a SID \$09 CVN Request with 9 CVNs (11-bit, 500K; 8 ECUs w/ Order Swap)

Test ID:	\$30109012
Purpose:	The purpose of this test is to verify that the DUT can correctly request SID \$09 INF \$06 when 8 ECUs responds with 9 CVNs each.
Rationale:	This test will use positive responses from eight different ECUs. The order of ECU responses will be different than that of the original connection order with ECU3 through ECU8 indicating that no SID \$01 PIDs are supported.
Set Up:	The DUT and ECUSIM shall be in the "ISO 15765 (11-bit, 500K, 8 ECUs) SID9 Ready State", which is detailed in 5.4.3.17.
Procedure:	
<u>ACTION- DUT</u>	Initiate the request for SID \$09 INF \$06 (CVN).
<u>EVALUATION</u>	Pass if the 15765_11_SID\$09_INF\$06 message was transmitted.
<u>ACTION- ECUSIM</u>	Delay <i>P2_MIN</i> before transmitting each of the following messages 15765_11_ECU8_SID\$09_INF\$06_9, 15765_11_ECU1_SID\$09_INF\$06_9, 15765_11_ECU7_SID\$09_INF\$06_9, 15765_11_ECU2_SID\$09_INF\$06_9, 15765_11_ECU6_SID\$09_INF\$06_9, 15765_11_ECU3_SID\$09_INF\$06_9, 15765_11_ECU5_SID\$09_INF\$06_9, 15765_11_ECU4_SID\$09_INF\$06_9.
<u>EVALUATION</u>	Pass if the following is true: Transmission is successful. The DUT indicates that the CVN for ECU #1 is \$1791BC88, \$1891BC87, \$1991BC86, \$1A91BC85, \$1B91BC84, \$1C91BC83, \$1D91BC82, \$1E55AA81, \$1FFF0080. The DUT indicates that the CVN for ECU #2 is \$2791BC88, \$2891BC87, \$2991BC86, \$2A91BC85, \$2B91BC84, \$2C91BC83, \$2D91BC82, \$2E55AA81, \$2FFF0080. The DUT indicates that the CVN for ECU #3 is \$3791BC88, \$3891BC87, \$3991BC86, \$3A91BC85, \$3B91BC84, \$3C91BC83, \$3D91BC82, \$3E55AA81, \$3FFF0080. The DUT indicates that the CVN for ECU #4 is \$4791BC88, \$4891BC87, \$4991BC86, \$4A91BC85, \$4B91BC84, \$4C91BC83, \$4D91BC82, \$4E55AA81, \$4FFF0080. The DUT indicates that the CVN for ECU #5 is \$5791BC88, \$5891BC87, \$5991BC86, \$5A91BC85, \$5B91BC84, \$5C91BC83, \$5D91BC82, \$5E55AA81, \$5FFF0080. The DUT indicates that the CVN for ECU #6 is \$6791BC88, \$6891BC87, \$6991BC86, \$6A91BC85, \$6B91BC84, \$6C91BC83, \$6D91BC82, \$6E55AA81, \$6FFF0080. The DUT indicates that the CVN for ECU #7 is \$7791BC88, \$7891BC87, \$7991BC86, \$7A91BC85, \$7B91BC84, \$7C91BC83, \$7D91BC82, \$7E55AA81, \$7FFF0080. The DUT indicates that the CVN for ECU #8 is \$8791BC88, \$8891BC87, \$8991BC86, \$8A91BC85, \$8B91BC84, \$8C91BC83, \$8D91BC82, \$8E55AA81, \$8FFF0080.

Figure 113 - Verify an ISO 15765-4 SID \$09 CVN request with 9 CVNs on an ECU (11-bit, 500K)

9.2.56 Verify a SID \$09 CVN Request with 9 CVNs (29-bit, 500K; 8 ECUs w/ Order Swap)

Test ID:	\$30109013
Purpose:	The purpose of this test is to verify that the DUT can correctly request SID \$09 INF \$06 when 8 ECUs responds with 9 CVNs each.
Rationale:	This test will use positive responses from eight different ECUs. The order of ECU responses will be different than that of the original connection order with ECU3 through ECU8 indicating that no SID \$01 PIDs are supported.
Set Up:	The DUT and ECUSIM shall be in the "ISO 15765 (29-bit, 500K, 8 ECUs) SID9 Ready State", which is detailed in 5.4.3.19.
Procedure:	
<u>ACTION- DUT</u>	Initiate the request for SID \$09 INF \$06 (CVN).
<u>EVALUATION</u>	Pass if the 15765_29_SID\$09_INF\$06 message was transmitted.
<u>ACTION- ECUSIM</u>	Delay <i>P2_MIN</i> before transmitting each of the following messages 15765_29_ECU8_SID\$09_INF\$06_9, 15765_29_ECU1_SID\$09_INF\$06_9, 15765_29_ECU7_SID\$09_INF\$06_9, 15765_29_ECU2_SID\$09_INF\$06_9, 15765_29_ECU6_SID\$09_INF\$06_9, 15765_29_ECU3_SID\$09_INF\$06_9, 15765_29_ECU5_SID\$09_INF\$06_9, 15765_29_ECU4_SID\$09_INF\$06_9.
<u>EVALUATION</u>	Pass if the following is true: Transmission is successful. The DUT indicates that the CVN for ECU #1 is \$1791BC88, \$1891BC87, \$1991BC86, \$1A91BC85, \$1B91BC84, \$1C91BC83, \$1D91BC82, \$1E55AA81, \$1FFF0080. The DUT indicates that the CVN for ECU #2 is \$2791BC88, \$2891BC87, \$2991BC86, \$2A91BC85, \$2B91BC84, \$2C91BC83, \$2D91BC82, \$2E55AA81, \$2FFF0080. The DUT indicates that the CVN for ECU #3 is \$3791BC88, \$3891BC87, \$3991BC86, \$3A91BC85, \$3B91BC84, \$3C91BC83, \$3D91BC82, \$3E55AA81, \$3FFF0080. The DUT indicates that the CVN for ECU #4 is \$4791BC88, \$4891BC87, \$4991BC86, \$4A91BC85, \$4B91BC84, \$4C91BC83, \$4D91BC82, \$4E55AA81, \$4FFF0080. The DUT indicates that the CVN for ECU #5 is \$5791BC88, \$5891BC87, \$5991BC86, \$5A91BC85, \$5B91BC84, \$5C91BC83, \$5D91BC82, \$5E55AA81, \$5FFF0080. The DUT indicates that the CVN for ECU #6 is \$6791BC88, \$6891BC87, \$6991BC86, \$6A91BC85, \$6B91BC84, \$6C91BC83, \$6D91BC82, \$6E55AA81, \$6FFF0080. The DUT indicates that the CVN for ECU #7 is \$7791BC88, \$7891BC87, \$7991BC86, \$7A91BC85, \$7B91BC84, \$7C91BC83, \$7D91BC82, \$7E55AA81, \$7FFF0080. The DUT indicates that the CVN for ECU #8 is \$8791BC88, \$8891BC87, \$8991BC86, \$8A91BC85, \$8B91BC84, \$8C91BC83, \$8D91BC82, \$8E55AA81, \$8FFF0080.

Figure 114 - Verify an ISO 15765-4 SID \$09 CVN request with 9 CVNs on an ECU (29-bit, 500K)

9.2.57 Verify a SID \$09 IPT (INF\$08, 32 bytes) Request (11-bit, 500K; 2 ECUs w/ Order Swap)

Test ID:	\$30109014
Purpose:	The purpose of this test is to verify that the DUT can correctly request SID \$09 INF \$08 (32 bytes).
Rationale:	This test will use positive responses from two ECUs. The order of ECU responses will be different than that of the original connection order.
Set Up:	The DUT and ECUSIM shall be in the "ISO 15765 (11-bit, 500K, 2 ECUs) SID9 Ready State", which is detailed in 5.4.3.13.
Procedure:	
<u>ACTION- DUT</u>	Initiate the request for SID \$09 INF \$08 (IPT).
<u>EVALUATION</u>	Pass if the 15765_11_SID\$09_INF\$08 message was transmitted.
<u>ACTION- ECUSIM</u>	After the <i>P2_MIN</i> delay, transmit the message 15765_11_ECU2_SID\$09_INF\$08_32 , delay <i>P2_MIN</i> , then transmit the message 15765_11_ECU1_SID\$09_INF\$08_32 .
<u>EVALUATION</u>	Pass if the following is true: Transmission is successful. The DUT indicates that the IPT for ECU #1 is 32 bytes and has the following values: OBDCOND = 100 IGNCNTR = 105 CATCOMP1 = 10 CATCOND1 = 15 CATCOMP2 = 00 CATCOND2 = 00 O2COMP1 = 30 O2COND1 = 35 O2COMP2 = 00 O2COND2 = 00 EGRCOMP = 50 EGRCOND = 55 AIRCOMP = 60 AIRCOND = 65 EVAPCOND = 70 EVAPCOND = 75 The DUT indicates that the IPT for ECU #2 is 32 bytes and has the following values: OBDCOND = 100 IGNCNTR = 105 CATCOMP1 = 00 CATCOND1 = 00 CATCOMP2 = 20 CATCOND2 = 25 O2COMP1 = 00 O2COND1 = 00 O2COMP2 = 40 O2COND2 = 45 EGRCOMP = 00 EGRCOND = 00 AIRCOMP = 00 AIRCOND = 00 EVAPCOND = 00 EVAPCOND = 00

Figure 115 - Verify an ISO 15765-4 SID \$09 IPT (INF\$08, 32 bytes) request (11-bit, 500K)

9.2.58 Verify a SID \$09 IPT (INF\$08, 32 bytes) Request (29-bit, 500K; 2 ECUs w/ Order Swap)

Test ID:	\$30109015
Purpose:	The purpose of this test is to verify that the DUT can correctly request SID \$09 INF \$08 (32 bytes).
Rationale:	This test will use positive responses from two ECUs. The order of ECU responses will be different than that of the original connection order.
Set Up:	The DUT and ECUSIM shall be in the "ISO 15765 (29-bit, 500K, 2 ECUs) SID9 Ready State", which is detailed in 5.4.3.15.
Procedure:	
<u>ACTION- DUT</u>	Initiate the request for SID \$09 INF \$08 (IPT).
<u>EVALUATION</u>	Pass if the 15765_29_SID\$09_INF\$08 message was transmitted.
<u>ACTION- ECUSIM</u>	After the <i>P2_MIN</i> delay, transmit the message 15765_29_ECU2_SID\$09_INF\$08_32 , delay <i>P2_MIN</i> , then transmit the message 15765_29_ECU1_SID\$09_INF\$08_32 .
<u>EVALUATION</u>	Pass if the following is true: Transmission is successful. The DUT indicates that the IPT for ECU #1 is 32 bytes and has the following values: OBDCOND = 100 IGNCNTR = 105 CATCOMP1 = 10 CATCOND1 = 15 CATCOMP2 = 00 CATCOND2 = 00 O2COMP1 = 30 O2COND1 = 35 O2COMP2 = 00 O2COND2 = 00 EGRCOMP = 50 EGRCOND = 55 AIRCOMP = 60 AIRCOND = 65 EVAPCOND = 70 EVAPCOND = 75 The DUT indicates that the IPT for ECU #2 is 32 bytes and has the following values: OBDCOND = 100 IGNCNTR = 105 CATCOMP1 = 00 CATCOND1 = 00 CATCOMP2 = 20 CATCOND2 = 25 O2COMP1 = 00 O2COND1 = 00 O2COMP2 = 40 O2COND2 = 45 EGRCOMP = 00 EGRCOND = 00 AIRCOMP = 00 AIRCOND = 00 EVAPCOND = 00 EVAPCOND = 00

Figure 116 - Verify an ISO 15765-4 SID \$09 IPT (INF\$08, 32 bytes) request (29-bit, 500K)

9.2.59 Verify a SID \$09 IPT (INF\$08, 40 bytes) Request (11-bit, 500K; 2 ECUs w/ Order Swap)

Test ID:	\$30109016
Purpose:	The purpose of this test is to verify that the DUT can correctly request SID \$09 INF \$08 (40 bytes).
Rationale:	This test will use positive responses from two ECUs. The order of ECU responses will be different than that of the original connection order.
Set Up:	The DUT and ECUSIM shall be in the "ISO 15765 (11-bit, 500K, 2 ECUs) SID9 Ready State", which is detailed in 5.4.3.13.
Procedure:	
<u>ACTION- DUT</u>	Initiate the request for SID \$09 INF \$08 (IPT).
<u>EVALUATION</u>	Pass if the 15765_11_SID\$09_INF\$08 message was transmitted.
<u>ACTION- ECUSIM</u>	After the <i>P2_MIN</i> delay, transmit the message 15765_11_ECU2_SID\$09_INF\$08_40 , delay <i>P2_MIN</i> , then transmit the message 15765_11_ECU1_SID\$09_INF\$08_40 .
<u>EVALUATION</u>	Pass if the following is true: Transmission is successful. The DUT indicates that the IPT for ECU #1 is 40 bytes and has the following values: OBDCOND = 100 IGNCNTR = 105 CATCOMP1 = 10 CATCOND1 = 15 CATCOMP2 = 00 CATCOND2 = 00 O2COMP1 = 30 O2COND1 = 35 O2COMP2 = 00 O2COND2 = 00 EGRCOMP = 50 EGRCOND = 55 AIRCOMP = 60 AIRCOND = 65 EVAPCOND = 70 EVAPCOND = 75 SO2SCOMP1 = 90 SO2SCOND1 = 95 SO2SCOMP2 = 00 SO2SCOND2 = 00 The DUT indicates that the IPT for ECU #2 is 40 bytes and has the following values: OBDCOND = 100 IGNCNTR = 105 CATCOMP1 = 00 CATCOND1 = 00 CATCOMP2 = 20 CATCOND2 = 25 O2COMP1 = 00 O2COND1 = 00 O2COMP2 = 40 O2COND2 = 45 EGRCOMP = 00 EGRCOND = 00

```

AIRCOMP = 00
AIRCOND = 00
EVAPCOND = 00
EVAPCOND = 00
SO2SCOMP1 = 00
SO2SCOND1 = 00
SO2SCOMP2 = 90
SO2SCOND2 = 95

```

Figure 117 - Verify an ISO 15765-4 SID \$09 IPT (INF\$08, 40 bytes) request (11-bit, 500K)

9.2.60 Verify a SID \$09 IPT (INF\$08, 40 bytes) Request (29-bit, 500K; 2 ECUs w/ Order Swap)

Test ID:	\$30109017
Purpose:	The purpose of this test is to verify that the DUT can correctly request SID \$09 INF \$08 (40 bytes).
Rationale:	This test will use positive responses from two ECUs. The order of ECU responses will be different than that of the original connection order.
Set Up:	The DUT and ECUSIM shall be in the "ISO 15765 (29-bit, 500K, 2 ECUs) SID9 Ready State", which is detailed in 5.4.3.15.
Procedure:	
<u>ACTION- DUT</u>	Initiate the request for SID \$09 INF \$08 (IPT).
<u>EVALUATION</u>	Pass if the 15765_29_SID\$09_INF\$08 message was transmitted.
<u>ACTION- ECUSIM</u>	After the <i>P2_MIN</i> delay, transmit the message 15765_29_ECU2_SID\$09_INF\$08_40 , delay <i>P2_MIN</i> , then transmit the message 15765_29_ECU1_SID\$09_INF\$08_40 .
<u>EVALUATION</u>	Pass if the following is true: Transmission is successful. The DUT indicates that the IPT for ECU #1 is 40 bytes and has the following values: OBDCOND = 100 IGNCNTR = 105 CATCOMP1 = 10 CATCOND1 = 15 CATCOMP2 = 00 CATCOND2 = 00 O2COMP1 = 30 O2COND1 = 35 O2COMP2 = 00 O2COND2 = 00 EGRCOMP = 50 EGRCOND = 55 AIRCOMP = 60 AIRCOND = 65 EVAPCOND = 70 EVAPCOND = 75 SO2SCOMP1 = 90 SO2SCOND1 = 95 SO2SCOMP2 = 00 SO2SCOND2 = 00 The DUT indicates that the IPT for ECU #2 is 40 bytes and has the following values: OBDCOND = 100

```

IGNCNTR = 105
CATCOMP1 = 00
CATCOND1 = 00
CATCOMP2 = 20
CATCOND2 = 25
O2COMP1 = 00
O2COND1 = 00
O2COMP2 = 40
O2COND2 = 45
EGRCOMP = 00
EGRCOND = 00
AIRCOMP = 00
AIRCOND = 00
EVAPCOND = 00
EVAPCOND = 00
SO2SCOMP1 = 00
SO2SCOND1 = 00
SO2SCOMP2 = 90
SO2SCOND2 = 95

```

Figure 118 - Verify an ISO 15765-4 SID \$09 IPT (INF\$08, 40 bytes) request (29-bit, 500K)

9.2.61 Verify a SID \$09 ECU Name Request (11-bit, 500K; 8 ECUs w/ Order Swap)

Test ID:	\$30109018
Purpose:	The purpose of this test is to verify that the DUT can correctly request SID \$09 INF \$0A.
Rationale:	This test will use positive responses from eight different ECUs. The order of ECU responses will be different than that of the original connection order.
Set Up:	The DUT and ECUSIM shall be in the "ISO 15765 (11-bit, 500K, 8 ECUs) SID9 Ready State", which is detailed in 5.4.3.17.
Procedure:	
<u>ACTION- DUT</u>	Initiate the request for SID \$09 INF \$0A (ECU Name).
<u>EVALUATION</u>	Pass if the 15765_11_SID\$09_INF\$0A message was transmitted.
<u>ACTION- ECUSIM</u>	Delay <i>P2_MIN</i> before transmitting each of the following messages 15765_11_ECU4_SID\$09_INF\$0A, 15765_11_ECU5_SID\$09_INF\$0A, 15765_11_ECU6_SID\$09_INF\$0A, 15765_11_ECU3_SID\$09_INF\$0A, 15765_11_ECU2_SID\$09_INF\$0A, 15765_11_ECU7_SID\$09_INF\$0A, 15765_11_ECU1_SID\$09_INF\$0A, 15765_11_ECU8_SID\$09_INF\$0A.
<u>EVALUATION</u>	Pass if the following are true: Transmission is successful. The DUT indicates that the ECU Name for ECU #1 is "ECM1-EngineControl1". The DUT indicates that the ECU Name for ECU #2 is "ECM2-EngineControl2". The DUT indicates that the ECU Name for ECU #3 is "TCM1-TransmisCtrl1". The DUT indicates that the ECU Name for ECU #4 is "ECC1-EmisCritInfo1". The DUT indicates that the ECU Name for ECU #5 is "ECC2-EmisCritInfo2". The DUT indicates that the ECU Name for ECU #6 is "TCM2-TransmisCtrl2". The DUT indicates that the ECU Name for ECU #7 is "TCC1-TransfCaseCtrl1". The DUT indicates that the ECU Name for ECU #8 is "TCC2-TransfCaseCtrl2".

Figure 119 - Verify an ISO 15765-4 SID \$09 ECU name request (11-bit, 500K)

9.2.62 Verify a SID \$09 ECU Name Request (29-bit, 500K; 8 ECUs w/ Order Swap)

Test ID:	\$30109019
Purpose:	The purpose of this test is to verify that the DUT can correctly request SID \$09 INF \$0A.
Rationale:	This test will use positive responses from eight different ECUs. The order of ECU responses will be different than that of the original connection order.
Set Up:	The DUT and ECUSIM shall be in the "ISO 15765 (29-bit, 500K, 8 ECUs) SID9 Ready State", which is detailed in 5.4.3.19.
Procedure:	
<u>ACTION- DUT</u>	Initiate the request for SID \$09 INF \$0A (ECU Name).
<u>EVALUATION</u>	Pass if the 15765_29_SID\$09_INF\$0A message was transmitted.
<u>ACTION- ECUSIM</u>	Delay <i>P2_MIN</i> before transmitting each of the following messages 15765_29_ECU4_SID\$09_INF\$0A, 15765_29_ECU5_SID\$09_INF\$0A, 15765_29_ECU6_SID\$09_INF\$0A, 15765_29_ECU3_SID\$09_INF\$0A, 15765_29_ECU2_SID\$09_INF\$0A, 15765_29_ECU7_SID\$09_INF\$0A, 15765_29_ECU1_SID\$09_INF\$0A, 15765_29_ECU8_SID\$09_INF\$0A.
<u>EVALUATION</u>	Pass if the following are true: Transmission is successful. The DUT indicates that the ECU Name for ECU #1 is "ECM1-EngineControl1". The DUT indicates that the ECU Name for ECU #2 is "ECM2-EngineControl2". The DUT indicates that the ECU Name for ECU #3 is "TCM1-TransmisCtrl1". The DUT indicates that the ECU Name for ECU #4 is "ECC1-EmisCritInfo1". The DUT indicates that the ECU Name for ECU #5 is "ECC2-EmisCritInfo2". The DUT indicates that the ECU Name for ECU #6 is "TCM2-TransmisCtrl2". The DUT indicates that the ECU Name for ECU #7 is "TCC1-TransfCaseCtrl1". The DUT indicates that the ECU Name for ECU #8 is "TCC2-TransfCaseCtrl2".

Figure 120 - Verify an ISO 15765-4 SID \$09 ECU name request (29-bit, 500K)

9.2.63 Verify a SID \$09 IPT (INF\$0B, 32 bytes) Request (11-bit, 500K; 2 ECUs w/ Order Swap)

Test ID:	\$3010901A
Purpose:	The purpose of this test is to verify that the DUT can correctly request SID \$09 INF \$0B (32 bytes).
Rationale:	This test will use positive responses from two ECUs. The order of ECU responses will be different than that of the original connection order.
Set Up:	The DUT and ECUSIM shall be in the "ISO 15765 (11-bit, 500K, 2 ECUs) SID9 Diesel Ready State", which is detailed in 5.4.3.14.
Procedure:	
<u>ACTION- DUT</u>	Initiate the request for SID \$09 INF \$0B (IPT).
<u>EVALUATION</u>	Pass if the 15765_11_SID\$09_INF\$0B message was transmitted.
<u>ACTION- ECUSIM</u>	After the <i>P2_MIN</i> delay, transmit the message 15765_11_ECU2_SID\$09_INF\$0B_32 , delay <i>P2_MIN</i> , then transmit the message 15765_11_ECU1_SID\$09_INF\$0B_32 .
<u>EVALUATION</u>	Pass if the following is true: Transmission is successful. The DUT indicates that the IPT for ECU #1 is 32 bytes and has the following values: OBDCOND = 100 IGNCNTR = 105 HCCATCOMP1 = 10 HCCATCOND1 = 15 NCATCOMP2 = 00 NCATCOND2 = 00 NADSCOMP1 = 00 NADSCOND1 = 00 PMCOMP2 = 00 PMCOND2 = 00 EGSCOMP = 50 EGSCOND = 55 EGRCOMP = 60 EGRCOND = 65 BPCOND = 70 BPCOND = 75 The DUT indicates that the IPT for ECU #2 is 32 bytes and has the following values: OBDCOND = 100 IGNCNTR = 105 HCCATCOMP1 = 00 HCCATCOND1 = 00 NCATCOMP2 = 20 NCATCOND2 = 25 NADSCOMP1 = 00 NADSCOND1 = 00 PMCOMP2 = 40 PMCOND2 = 45 EGSCOMP = 00 EGSCOND = 00 EGRCOMP = 00 EGRCOND = 00 BPCOND = 00 BPCOND = 00

Figure 121 - Verify an ISO 15765-4 SID \$09 IPT (INF\$0B, 32 bytes) request (11-bit, 500K)

9.2.64 Verify a SID \$09 IPT (INF\$0B, 32 bytes) Request (29-bit, 500K; 2 ECUs w/ Order Swap)

Test ID:	\$3010901B
Purpose:	The purpose of this test is to verify that the DUT can correctly request SID \$09 INF \$0B (32 bytes).
Rationale:	This test will use positive responses from two ECUs. The order of ECU responses will be different than that of the original connection order.
Set Up:	The DUT and ECUSIM shall be in the "ISO 15765 (29-bit, 500K, 2 ECUs) SID9 Diesel Ready State", which is detailed in 5.4.3.16.
Procedure:	
<u>ACTION- DUT</u>	Initiate the request for SID \$09 INF \$0B (IPT).
<u>EVALUATION</u>	Pass if the 15765_29_SID\$09_INF\$0B message was transmitted.
<u>ACTION- ECUSIM</u>	After the <i>P2_MIN</i> delay, transmit the message 15765_29_ECU2_SID\$09_INF\$0B_32 , delay <i>P2_MIN</i> , then transmit the message 15765_29_ECU1_SID\$09_INF\$0B_32 .
<u>EVALUATION</u>	Pass if the following is true: Transmission is successful. The DUT indicates that the IPT for ECU #1 is 32 bytes and has the following values: OBDCOND = 100 IGNCNTR = 105 HCCATCOMP1 = 10 HCCATCOND1 = 15 NCATCOMP2 = 00 NCATCOND2 = 00 NADSCOMP1 = 00 NADSCOND1 = 00 PMCOMP2 = 00 PMCOND2 = 00 EGSCOMP = 50 EGSCOND = 55 EGRCOMP = 60 EGRCOND = 65 BPCOND = 70 BPCOND = 75 The DUT indicates that the IPT for ECU #2 is 32 bytes and has the following values: OBDCOND = 100 IGNCNTR = 105 HCCATCOMP1 = 00 HCCATCOND1 = 00 NCATCOMP2 = 20 NCATCOND2 = 25 NADSCOMP1 = 00 NADSCOND1 = 00 PMCOMP2 = 40 PMCOND2 = 45 EGSCOMP = 00 EGSCOND = 00 EGRCOMP = 00 EGRCOND = 00 BPCOND = 00 BPCOND = 00

Figure 122 - Verify an ISO 15765-4 SID \$09 IPT (INF\$0B, 32 bytes) request (29-bit, 500K)

9.2.65 Verify a SID \$09 IPT (INF\$0B, 36 bytes) Request (11-bit, 500K; 2 ECUs w/ Order Swap)

Test ID:	\$3010901C
Purpose:	The purpose of this test is to verify that the DUT can correctly request SID \$09 INF \$0B (36 bytes).
Rationale:	This test will use positive responses from two ECUs. The order of ECU responses will be different than that of the original connection order.
Set Up:	The DUT and ECUSIM shall be in the "ISO 15765 (11-bit, 500K, 2 ECUs) SID9 Diesel Ready State", which is detailed in 5.4.3.14.
Procedure:	
<u>ACTION- DUT</u>	Initiate the request for SID \$09 INF \$0B (IPT).
<u>EVALUATION</u>	Pass if the 15765_11_SID\$09_INF\$0B message was transmitted.
<u>ACTION- ECUSIM</u>	After the <i>P2_MIN</i> delay, transmit the message 15765_11_ECU2_SID\$09_INF\$0B_36 , delay <i>P2_MIN</i> , then transmit the message 15765_11_ECU1_SID\$09_INF\$0B_36 .
<u>EVALUATION</u>	Pass if the following is true: Transmission is successful. The DUT indicates that the IPT for ECU #1 is 36 bytes and has the following values: OBDCOND = 100 IGNCNTR = 105 HCCATCOMP1 = 10 HCCATCOND1 = 15 NCATCOMP2 = 00 NCATCOND2 = 00 NADSCOMP1 = 00 NADSCOND1 = 00 PMCOMP2 = 00 PMCOND2 = 00 EGSCOMP = 50 EGSCOND = 55 EGRCOMP = 60 EGRCOND = 65 BPCOND = 70 BPCOND = 75 FUELCOND = 80 FUELCOND = 85 The DUT indicates that the IPT for ECU #2 is 36 bytes and has the following values: OBDCOND = 100 IGNCNTR = 105 HCCATCOMP1 = 00 HCCATCOND1 = 00 NCATCOMP2 = 20 NCATCOND2 = 25 NADSCOMP1 = 00 NADSCOND1 = 00 PMCOMP2 = 40 PMCOND2 = 45 EGSCOMP = 00 EGSCOND = 00 EGRCOMP = 00 EGRCOND = 00

BPCOND = 00
 BPCOND = 00
 FUELCOND = 00
 FUELCOND = 00

Figure 123 - Verify an ISO 15765-4 SID \$09 IPT (INF\$0B, 36 bytes) request (11-bit, 500K)

9.2.66 Verify a SID \$09 IPT (INF\$0B, 36 bytes) Request (29-bit, 500K; 2 ECUs w/ Order Swap)

Test ID:	\$3010901D
Purpose:	The purpose of this test is to verify that the DUT can correctly request SID \$09 INF \$0B (36 bytes).
Rationale:	This test will use positive responses from two ECUs. The order of ECU responses will be different than that of the original connection order.
Set Up:	The DUT and ECUSIM shall be in the "ISO 15765 (29-bit, 500K, 2 ECUs) SID9 Diesel Ready State", which is detailed in 5.4.3.16.
Procedure:	
<u>ACTION- DUT</u>	Initiate the request for SID \$09 INF \$0B (IPT).
<u>EVALUATION</u>	Pass if the 15765_29_SID\$09_INF\$0B message was transmitted.
<u>ACTION- ECUSIM</u>	After the <i>P2_MIN</i> delay, transmit the message 15765_29_ECU2_SID\$09_INF\$0B_36 , delay <i>P2_MIN</i> , then transmit the message 15765_29_ECU1_SID\$09_INF\$0B_36 .
<u>EVALUATION</u>	Pass if the following is true: Transmission is successful. The DUT indicates that the IPT for ECU #1 is 36 bytes and has the following values: OBDCOND = 100 IGNCNTR = 105 HCCATCOMP1 = 10 HCCATCOND1 = 15 NCATCOMP2 = 00 NCATCOND2 = 00 NADSCOMP1 = 00 NADSCOND1 = 00 PMCOMP2 = 00 PMCOND2 = 00 EGSCOMP = 50 EGSCOND = 55 EGRCOMP = 60 EGRCOND = 65 BPCOND = 70 BPCOND = 75 FUELCOND = 80 FUELCOND = 85 The DUT indicates that the IPT for ECU #2 is 36 bytes and has the following values: OBDCOND = 100 IGNCNTR = 105 HCCATCOMP1 = 00 HCCATCOND1 = 00 NCATCOMP2 = 20 NCATCOND2 = 25 NADSCOMP1 = 00

NADSCOND1 = 00
PMCOMP2 = 40
PMCOND2 = 45
EGSCOMP = 00
EGSCOND = 00
EGRCOMP = 00
EGRCOND = 00
BPCOND = 00
BPCOND = 00
FUELCOND = 00
FUELCOND = 00

Figure 124 - Verify an ISO 15765-4 SID \$09 IPT (INF\$0B, 36 bytes) request (29-bit, 500K)

9.2.67 Verify a SID \$09 ESN Request (11-bit, 500K; 8 ECUs)

Test ID:	\$3010901E
Purpose:	The purpose of this test is to verify that the DUT can correctly request SID \$09 INF \$0D.
Rationale:	This test will use positive responses from eight different ECUs. The order of ECU responses will be the same as that of the original connection order.
Set Up:	The DUT and ECUSIM shall be in the "ISO 15765 (11-bit, 500K, 8 ECUs) SID9 Diesel Ready State", which is detailed in 5.4.3.18.
Procedure:	
<u>ACTION- DUT</u>	Initiate the request for SID \$09 INF \$0D (ESN).
<u>EVALUATION</u>	Pass if the 15765_11_SID\$09_INF\$0D message was transmitted.
<u>ACTION- ECUSIM</u>	Delay <i>P2_MIN</i> before transmitting each of the following messages 15765_11_ECU1_SID\$09_INF\$0D, 15765_11_ECU2_SID\$09_INF\$0D, 15765_11_ECU3_SID\$09_INF\$0D, 15765_11_ECU4_SID\$09_INF\$0D, 15765_11_ECU5_SID\$09_INF\$0D, 15765_11_ECU6_SID\$09_INF\$0D, 15765_11_ECU7_SID\$09_INF\$0D, 15765_11_ECU8_SID\$09_INF\$0D.
<u>EVALUATION</u>	Pass if the following are true: Transmission is successful The DUT indicates that the ESN for ECU #1 is "VALESN987651". The DUT indicates that the ESN for ECU #2 is "VALESN987652". The DUT indicates that the ESN for ECU #3 is "VALESN987653". The DUT indicates that the ESN for ECU #4 is "VALESN987654". The DUT indicates that the ESN for ECU #5 is "VALESN987655". The DUT indicates that the ESN for ECU #6 is "VALESN987656". The DUT indicates that the ESN for ECU #7 is "VALESN987657". The DUT indicates that the ESN for ECU #8 is "VALESN987658".

Figure 125 - Verify an ISO 15765-4 SID \$09 ESN request (11-bit, 500K)

9.2.68 Verify a SID \$09 ESN Request (29-bit, 500K; 8 ECUs)

Test ID:	\$3010901F
Purpose:	The purpose of this test is to verify that the DUT can correctly request SID \$09 INF \$0D.
Rationale:	This test will use positive responses from eight different ECUs. The order of ECU responses will be the same as that of the original connection order.
Set Up:	The DUT and ECUSIM shall be in the "ISO 15765 (29-bit, 500K, 8 ECUs) SID9 Diesel Ready State", which is detailed in 5.4.3.20.
Procedure:	
<u>ACTION- DUT</u>	Initiate the request for SID \$09 INF \$0D (ESN).
<u>EVALUATION</u>	Pass if the 15765_29_SID\$09_INF\$0D message was transmitted.
<u>ACTION- ECUSIM</u>	Delay <i>P2_MIN</i> before transmitting each of the following messages 15765_29_ECU1_SID\$09_INF\$0D, 15765_29_ECU2_SID\$09_INF\$0D, 15765_29_ECU3_SID\$09_INF\$0D, 15765_29_ECU4_SID\$09_INF\$0D, 15765_29_ECU5_SID\$09_INF\$0D, 15765_29_ECU6_SID\$09_INF\$0D, 15765_29_ECU7_SID\$09_INF\$0D, 15765_29_ECU8_SID\$09_INF\$0D.
<u>EVALUATION</u>	Pass if the following are true: Transmission is successful The DUT indicates that the ESN for ECU #1 is "VALESN987651". The DUT indicates that the ESN for ECU #2 is "VALESN987652". The DUT indicates that the ESN for ECU #3 is "VALESN987653". The DUT indicates that the ESN for ECU #4 is "VALESN987654". The DUT indicates that the ESN for ECU #5 is "VALESN987655". The DUT indicates that the ESN for ECU #6 is "VALESN987656". The DUT indicates that the ESN for ECU #7 is "VALESN987657". The DUT indicates that the ESN for ECU #8 is "VALESN987658".

Figure 126 - Verify an ISO 15765-4 SID \$09 ESN request (29-bit, 500K)

9.2.69 Verify a SID \$09 EROTAN Request (11-bit, 500K; 8 ECUs w/ Order Swap)

Test ID:	\$30109020
Purpose:	The purpose of this test is to verify that the DUT can correctly request SID \$09 INF \$0F.
Rationale:	This test will use positive responses from eight different ECUs. The order of ECU responses will be different than that of the original connection order.
Set Up:	The DUT and ECUSIM shall be in the "ISO 15765 (11-bit, 500K, 8 ECUs) SID9 Diesel Ready State", which is detailed in 5.4.3.18.
Procedure:	
<u>ACTION- DUT</u>	Initiate the request for SID \$09 INF \$0F (EROTAN).
<u>EVALUATION</u>	Pass if the 15765_11_SID\$09_INF\$0F message was transmitted.
<u>ACTION- ECUSIM</u>	Delay <i>P2_MIN</i> before transmitting each of the following messages 15765_11_ECU8_SID\$09_INF\$0F, 15765_11_ECU7_SID\$09_INF\$0F, 15765_11_ECU6_SID\$09_INF\$0F, 15765_11_ECU5_SID\$09_INF\$0F, 15765_11_ECU4_SID\$09_INF\$0F, 15765_11_ECU3_SID\$09_INF\$0F, 15765_11_ECU2_SID\$09_INF\$0F, 15765_11_ECU1_SID\$09_INF\$0F.
<u>EVALUATION</u>	Pass if the following are true: Transmission is successful. The DUT indicates that the EROTAN for ECU #1 is "VALERTAN1". The DUT indicates that the EROTAN for ECU #2 is "VALERTAN2". The DUT indicates that the EROTAN for ECU #3 is "VALERTAN3". The DUT indicates that the EROTAN for ECU #4 is "VALERTAN4". The DUT indicates that the EROTAN for ECU #5 is "VALERTAN5". The DUT indicates that the EROTAN for ECU #6 is "VALERTAN6". The DUT indicates that the EROTAN for ECU #7 is "VALERTAN7". The DUT indicates that the EROTAN for ECU #8 is "VALERTAN8".

Figure 127 - Verify an ISO 15765-4 SID \$09 EROTAN request (11-bit, 500K)

9.2.70 Verify a SID \$09 EROTAN Request (29-bit, 500K; 8 ECUs w/ Order Swap)

Test ID:	\$30109021
Purpose:	The purpose of this test is to verify that the DUT can correctly request SID \$09 INF \$0F.
Rationale:	This test will use positive responses from eight different ECUs. The order of ECU responses will be different than that of the original connection order.
Set Up:	The DUT and ECUSIM shall be in the "ISO 15765 (29-bit, 500K, 8 ECUs) SID9 Diesel Ready State", which is detailed in 5.4.3.20.
Procedure:	
<u>ACTION- DUT</u>	Initiate the request for SID \$09 INF \$0F (EROTAN).
<u>EVALUATION</u>	Pass if the 15765_29_SID\$09_INF\$0F message was transmitted.
<u>ACTION- ECUSIM</u>	Delay <i>P2_MIN</i> before transmitting each of the following messages 15765_29_ECU8_SID\$09_INF\$0F, 15765_29_ECU7_SID\$09_INF\$0F, 15765_29_ECU6_SID\$09_INF\$0F, 15765_29_ECU5_SID\$09_INF\$0F, 15765_29_ECU4_SID\$09_INF\$0F, 15765_29_ECU3_SID\$09_INF\$0F, 15765_29_ECU2_SID\$09_INF\$0F, 15765_29_ECU1_SID\$09_INF\$0F.
<u>EVALUATION</u>	Pass if the following are true: Transmission is successful. The DUT indicates that the EROTAN for ECU #1 is "VALERTAN1". The DUT indicates that the EROTAN for ECU #2 is "VALERTAN2". The DUT indicates that the EROTAN for ECU #3 is "VALERTAN3". The DUT indicates that the EROTAN for ECU #4 is "VALERTAN4". The DUT indicates that the EROTAN for ECU #5 is "VALERTAN5". The DUT indicates that the EROTAN for ECU #6 is "VALERTAN6". The DUT indicates that the EROTAN for ECU #7 is "VALERTAN7". The DUT indicates that the EROTAN for ECU #8 is "VALERTAN8".

Figure 128 - Verify an ISO 15765-4 SID \$09 EROTAN request (29-bit, 500K)

9.2.71 Verify a SID \$0A Permanent DTC Request with No DTCs (11-bit, 500K; 2 ECUs w/ Order Swap)

Test ID:	\$3010A000
Purpose:	The purpose of this test is to verify that the DUT can correctly request SID \$0A and process a 'no DTCs present' response.
Rationale:	This test will use positive responses from two different ECUs. The order of ECU responses will be different than that of the original connection order.
Set Up:	The DUT and ECUSIM shall be in the "ISO 15765 (11-bit, 500K, 2 ECUs) Initialized State", which is detailed in 5.4.3.9.
Procedure:	
<u>ACTION- DUT</u>	Initiate the request for SID \$0A (Permanent DTCs).
<u>EVALUATION</u>	Pass if the 15765_11_SID\$0A message was transmitted.
<u>ACTION- ECUSIM</u>	After the <i>P2_MIN</i> delay, transmit the message 15765_11_ECU2_SID\$0A_NoDTC , delay <i>P2_MIN</i> , then transmit the message 15765_11_ECU1_SID\$0A_NoDTC .
<u>EVALUATION</u>	Pass if transmission is successful and the DUT indicates that there are no permanent DTCs in either ECU.

Figure 129 - Verify an ISO 15765-4 SID \$0A permanent DTC request with no DTCs (11-bit, 500K)

9.2.72 Verify a SID \$0A Permanent DTC Request with No DTCs (29-bit, 500K; 2 ECUs w/ Order Swap)

Test ID:	\$3010A001
Purpose:	The purpose of this test is to verify that the DUT can correctly request SID \$0A and process a 'no DTCs present' response.
Rationale:	This test will use positive responses from two different ECUs. The order of ECU responses will be different than that of the original connection order.
Set Up:	The DUT and ECUSIM shall be in the "ISO 15765 (29-bit, 500K, 2 ECUs) Initialized State", which is detailed in 5.4.3.10.
Procedure:	
<u>ACTION- DUT</u>	Initiate the request for SID \$0A (Permanent DTCs).
<u>EVALUATION</u>	Pass if the 15765_29_SID\$0A message was transmitted.
<u>ACTION- ECUSIM</u>	After the <i>P2_MIN</i> delay, transmit the message 15765_29_ECU2_SID\$0A_NoDTC , delay <i>P2_MIN</i> , then transmit the message 15765_29_ECU1_SID\$0A_NoDTC .
<u>EVALUATION</u>	Pass if transmission is successful and the DUT indicates that there are no permanent DTCs in either ECU.

Figure 130 - Verify an ISO 15765-4 SID \$0A permanent DTC request with no DTCs (29-bit, 500K)

9.2.73 Verify a SID \$0A Permanent DTC Request with DTCs (11-bit, 500K; 2 ECUs)

Test ID:	\$3010A002
Purpose:	The purpose of this test is to verify that the DUT can correctly request SID \$0A and process a 'DTCs present' response.
Rationale:	This test will use positive responses from two different ECUs.
Set Up:	The DUT and ECUSIM shall be in the "ISO 15765 (11-bit, 500K, 2 ECUs) Initialized State", which is detailed in 5.4.3.9.
Procedure:	
<u>ACTION- DUT</u>	Initiate the request for SID \$0A (Permanent DTCs).
<u>EVALUATION</u>	Pass if the 15765_11_SID\$0A message was transmitted.
<u>ACTION- ECUSIM</u>	After the <i>P2_MIN</i> delay, transmit the message 15765_11_ECU1_SID\$0A_DTC , delay <i>P2_MIN</i> , then transmit the message 15765_11_ECU2_SID\$0A_NoDTC .
<u>EVALUATION</u>	Pass if the following is true: The transmission is successful. The DUT indicates that ECU #1 has the following permanent DTCs: P0107, P0110, P0115, and P0124. The DUT indicates that ECU #2 has no permanent DTCs.

Figure 131 - Verify an ISO 15765-4 SID \$0A permanent DTC request with DTCs (11-bit, 500K)

9.2.74 Verify a SID \$0A Permanent DTC Request with DTCs (29-bit, 500K; 2 ECUs)

Test ID:	\$3010A003
Purpose:	The purpose of this test is to verify that the DUT can correctly request SID \$0A and process a 'DTCs present' response.
Rationale:	This test will use positive responses from two different ECUs.
Set Up:	The DUT and ECUSIM shall be in the "ISO 15765 (29-bit, 500K, 2 ECUs) Initialized State", which is detailed in 5.4.3.10.
Procedure:	
<u>ACTION- DUT</u>	Initiate the request for SID \$0A (Permanent DTCs).
<u>EVALUATION</u>	Pass if the 15765_29_SID\$0A message was transmitted.
<u>ACTION- ECUSIM</u>	After the <i>P2_MIN</i> delay, transmit the message 15765_29_ECU1_SID\$0A_DTC , delay <i>P2_MIN</i> , then transmit the message 15765_29_ECU2_SID\$0A_NoDTC .
<u>EVALUATION</u>	Pass if the following is true: The transmission is successful. The DUT indicates that ECU #1 has the following permanent DTCs: P0107, P0110, P0115, and P0124. The DUT indicates that ECU #2 has no permanent DTCs.

Figure 132 - Verify an ISO 15765-4 SID \$0A permanent DTC request with DTCs (29-bit, 500K)

9.3 ISO 14230-4 Tests

These network tests are specific to ISO 14230-4. Unless otherwise specified, all references to Electrical Connections, ECU Addresses, Messages, Message Timing, and pre-defined states will be as described in 5.4.3.13.

9.3.1 Verify a SID \$01 PID Supported PIDs Requests (1 ECU)

Test ID:	\$30201000
Purpose:	The purpose of this test is to verify that the DUT can correctly request a SID \$01 PID Supported PIDs.
Rationale:	This test will use positive responses from a single different ECU.
Set Up:	The DUT and ECUSIM shall be in the “ISO 14230-4 (2 ECUs) Initialized State”, which is detailed in 5.4.4.6.
Procedure:	
<u>ACTION- DUT</u>	Initiate the request for SID \$01 PID Supported PIDs.
<u>EVALUATION</u>	Pass if the 14230_SID\$01_PID\$00 or 14230_SID\$01_PID\$20 or 14230_SID\$01_PID\$40 message was transmitted.
<u>ACTION- ECUSIM</u>	If the DUT transmitted 14230_SID\$01_PID\$00 then after the <i>P2</i> delay, transmit 14230_ECU1_SID\$01_PID\$00_20, delay <i>P2</i> and transmit 14230_ECU2_SID\$01_PID\$00. Wait for the remaining message transactions in this ACTION to be completed. If the DUT transmitted 14230_SID\$01_PID\$20 then after the <i>P2</i> delay, transmit 14230_ECU1_SID\$01_PID\$20, and wait for the remaining message transactions in this ACTION to be completed. If the DUT transmitted 14230_SID\$01_PID\$40 then after the <i>P2</i> delay, transmit 14230_ECU1_SID\$01_PID\$40, and wait for the remaining message transactions in this ACTION to be completed.
<u>EVALUATION</u>	Pass if all transmissions by the DUT and ECUSIM were successful and the DUT indicates that: ECU #1 supports PIDs \$01(Readiness Bits), \$0C (RPM), and \$41 (Monitor Status this drive cycle) are supported. ECU #2 supports PIDs \$01(Readiness Bits) and \$0C (RPM) are supported.

Figure 133 - Verify an ISO 14230-4 SID \$01 PID supported PID request

9.3.2 Verify a SID \$01 PID \$01 Request for Spark Ignition (2 ECUs w/ Order Swap)

Test ID:	\$30201001
Purpose:	The purpose of this test is to verify that the DUT can correctly request a SID \$01 PID, which the ECUSIM indicates is supported.
Rationale:	This test will use positive responses from two different ECUs. The order of ECU responses will be different than that of the original connection order. This test will also verify that the DUT can differentiate a spark ignition response from a compression ignition response.
Set Up:	The DUT and ECUSIM shall be in the “ISO 14230-4 (2 ECUs) Initialized State”, which is detailed in 5.4.4.6 with the ISO 14230-4 network connected to the ECUSIM. The ECUSIM shall be in the “ISO 14230-4 (2 ECUs) Initialized State” as defined in 5.4.4.6.
Procedure:	
<u>ACTION- DUT</u>	Initiate the request for SID \$01 PID \$01 (I/M Readiness Bits).
<u>EVALUATION</u>	Pass if the 14230_SID\$01_PID\$01 message was transmitted.
<u>ACTION- ECUSIM</u>	After the <i>P2</i> delay, transmit the message 14230_ECU2_SID\$01_PID\$01_SPARK , delay <i>P2</i> , then transmit the message 14230_ECU1_SID\$01_PID\$01_SPARK .
<u>EVALUATION</u>	Pass if the following is true: Transmission is successful. The DUT indicates that ECU #1 has the following values: MIL is OFF DCT COUNT is 0 SPARK IGNITION MONITORS are SUPPORTED MISFIRE is SUPPORTED and READY FUEL SYSTEM MONITORING is SUPPORTED and READY COMPREHENSIVE COMPONENT MONITORING is SUPPORTED and READY CATALYST MONITORING is SUPPORTED and NOT READY HEATED CATALYST MONITORING is SUPPORTED and NOT READY EVAPORATIVE SYSTEM MONITORING is SUPPORTED and NOT READY SECONDARY AIR SYSTEM MONITORING is SUPPORTED and NOT READY OXYGEN SENSOR MONITORING is SUPPORTED and NOT READY OXYGEN SENSOR HEATER MONITORING is SUPPORTED and NOT READY EGR/VVT SYSTEM MONITORING is SUPPORTED and NOT READY The DUT indicates that ECU #2 has the following values: MIL is ON DCT COUNT is 1 SPARK IGNITION MONITORS are SUPPORTED COMPREHENSIVE COMPONENT MONITORING is SUPPORTED and NOT READY

Figure 134 - Verify an ISO 14230-4 SID \$01 PID \$01 request for spark ignition

9.3.3 Verify a SID \$01 PID \$01 Request for Compression Ignition (2 ECUs w/ Order Swap)

Test ID:	\$30201002
Purpose:	The purpose of this test is to verify that the DUT can correctly request a SID \$01 PID, which the ECUSIM indicates is supported.
Rationale:	This test will use positive responses from two different ECUs. The order of ECU responses will be different than that of the original connection order. This test will also verify that the DUT can differentiate a spark ignition response from a compression ignition response.
Set Up:	The DUT and ECUSIM shall be in the “ISO 14230-4 (2 ECUs) Initialized State”, which is detailed in 5.4.4.6.
Procedure:	
<u>ACTION- DUT</u>	Initiate the request for SID \$01 PID \$01 (I/M Readiness Bits).
<u>EVALUATION</u>	Pass if the 14230_SID\$01_PID\$01 message was transmitted.
<u>ACTION- ECUSIM</u>	After the <i>P2</i> delay, transmit the message 14230_ECU2_SID\$01_PID\$01_COMP , delay <i>P2</i> , then transmit the message 14230_ECU1_SID\$01_PID\$01_COMP .
<u>EVALUATION</u>	Pass if the following is true: Transmission is successful. The DUT indicates that ECU #1 has the following values: MIL is OFF DCT COUNT is 0 COMPRESSION IGNITION MONITORS are SUPPORTED MISFIRE is SUPPORTED and READY FUEL SYSTEM MONITORING is SUPPORTED and READY COMPREHENSIVE COMPONENT MONITORING is SUPPORTED and READY NMHC MONITORING is SUPPORTED and NOT READY NOX AFTERTREATMENT MONITORING is SUPPORTED and NOT READY BOOST PRESSURE SYSTEM MONITORING is SUPPORTED and NOT READY EXHAUST GAS SENSOR MONITORING is SUPPORTED and NOT READY PM FILTER MONITORING is SUPPORTED and NOT READY EGR/VVT SYSTEM MONITORING is SUPPORTED and NOT READY The DUT indicates that ECU #2 has the following values: MIL is ON DCT COUNT is 1 COMPRESSION IGNITION MONITORS are SUPPORTED COMPREHENSIVE COMPONENT MONITORING is SUPPORTED and NOT READY

Figure 135 - Verify an ISO 14230-4 SID \$01 PID \$01 request for compression ignition

9.3.4 Verify a SID \$01 PID \$0C Request (2 ECUs w/ Order Swap)

Test ID:	\$30201003
Purpose:	The purpose of this test is to verify that the DUT can correctly request a SID \$01 PID, which the ECUSIM indicates is supported.
Rationale:	This test will use positive responses from two different ECUs. The order of ECU responses will be different than that of the original connection order.
Set Up:	The DUT and ECUSIM shall be in the “ISO 14230-4 (2 ECUs) Initialized State”, which is detailed in 5.4.4.6.
Procedure:	
<u>ACTION- DUT</u>	Initiate the request for SID \$01 PID \$0C (RPM).
<u>EVALUATION</u>	Pass if the 14230_SID\$01_PID\$0C message was transmitted.
<u>ACTION- ECUSIM</u>	After the <i>P2</i> delay, transmit the message 14230_ECU2_SID\$01_PID\$0C_KOEO , delay <i>P2</i> , then transmit the message 14230_ECU1_SID\$01_PID\$0C_KOEO .
<u>EVALUATION</u>	Pass if transmission is successful and the DUT indicates that engine RPM is 0.

Figure 136 - Verify an ISO 14230-4 SID \$01 PID \$0C request

9.3.5 Verify a SID \$02 PID Freeze Frame DTC Request with No DTCs (2 ECUs w/ Order Swap)

Test ID:	\$30202000
Purpose:	The purpose of this test is to verify that the DUT can correctly request SID \$02 PID \$02 (indicating that there is no Freeze Frame DTC), which the ECUSIM indicates is supported.
Rationale:	This test will use positive responses from two different ECUs. The order of ECU responses will be different than that of the original connection order.
Set Up:	The DUT and ECUSIM shall be in the “ISO 14230-4 (2 ECUs) Initialized State”, which is detailed in 5.4.4.6.
Procedure:	
<u>ACTION- DUT</u>	Initiate the request for SID \$02 PID \$02 (the Freeze Frame DTC).
<u>EVALUATION</u>	Pass if the 14230_SID\$02_PID\$02 message was transmitted.
<u>ACTION- ECUSIM</u>	After the <i>P2</i> delay, transmit the message 14230_ECU2_SID\$02_PID\$02_NoDTC , delay <i>P2</i> , then transmit the message 14230_ECU1_SID\$02_PID\$02_NoDTC .
<u>EVALUATION</u>	Pass if transmission is successful and the DUT indicates that there is no Freeze Frame DTC in either ECU.

Figure 137 - Verify an ISO 14230-4 SID \$02 PID freeze frame DTC request with no DTCs

9.3.6 Verify a SID \$02 PID Freeze Frame DTC Request with DTCs (2 ECUs)

Test ID:	\$30202001
Purpose:	The purpose of this test is to verify that the DUT can correctly request SID \$02 PID \$02 (indicating that there is a Freeze Frame DTC), which the ECUSIM indicates is supported.
Rationale:	This test will use positive responses from two different ECUs.
Set Up:	The DUT and ECUSIM shall be in the “ISO 14230-4 (2 ECUs) Initialized State”, which is detailed in 5.4.4.6.
Procedure:	
<u>ACTION- DUT</u>	Initiate the request for SID \$02 PID \$02 (the Freeze Frame DTC).
<u>EVALUATION</u>	Pass if the 14230_SID\$02_PID\$02 message was transmitted.
<u>ACTION- ECUSIM</u>	After the <i>P2</i> delay, transmit the message 14230_ECU1_SID\$02_PID\$02_DTC , delay <i>P2</i> , then transmit the message 14230_ECU2_SID\$02_PID\$02_NoDTC .
<u>EVALUATION</u>	Pass if the following is true: The transmission is successful. The DUT indicates that ECU #1 has a Freeze Frame DTC of P0107 and ECU #2 has no Freeze Frame DTC.

Figure 138 - Verify an ISO 14230-4 SID \$02 PID freeze frame DTC request with DTCs

9.3.7 Verify a SID \$03 Confirmed DTC Request with No DTCs (2 ECUs w/ Order Swap)

Test ID:	\$30203000
Purpose:	The purpose of this test is to verify that the DUT can correctly request SID \$03 and process a ‘no DTCs present’ response.
Rationale:	This test will use positive responses from two different ECUs. The order of ECU responses will be different than that of the original connection order.
Set Up:	The DUT and ECUSIM shall be in the “ISO 14230-4 (2 ECUs) Initialized State”, which is detailed in 5.4.4.6.
Procedure:	
<u>ACTION- DUT</u>	Initiate the request for SID \$03 (Confirmed DTCs).
<u>EVALUATION</u>	Pass if the 14230_SID\$03 message was transmitted.
<u>ACTION- ECUSIM</u>	After the <i>P2</i> delay, transmit the message 14230_ECU2_SID\$03_NoDTC , delay <i>P2</i> , then transmit the message 14230_ECU1_SID\$03_NoDTC .
<u>EVALUATION</u>	Pass if transmission is successful and the DUT indicates that there are no confirmed DTCs in either ECU.

Figure 139 - Verify an ISO 14230-4 SID \$03 confirmed DTC request with no DTCs

9.3.8 Verify a SID \$03 Confirmed DTC Request with DTCs (2 ECUs)

Test ID:	\$30203001
Purpose:	The purpose of this test is to verify that the DUT can correctly request SID \$03 and process a 'DTCs present' response.
Rationale:	This test will use positive responses from two different ECUs.
Set Up:	The DUT and ECUSIM shall be in the "ISO 14230-4 (2 ECUs) Initialized State", which is detailed in 5.4.4.6.
Procedure:	
<u>ACTION- DUT</u>	Initiate the request for SID \$03 (Confirmed DTCs).
<u>EVALUATION</u>	Pass if the 14230_SID\$03 message was transmitted.
<u>ACTION- ECUSIM</u>	After the <i>P2</i> delay, transmit the following messages (with a <i>P2</i> delay between each message): 14230_ECU1_SID\$03_DTC_M1, 14230_ECU1_SID\$03_DTC_M2, 14230_ECU2_SID\$03_NoDTC.
<u>EVALUATION</u>	Pass if the following is true: The transmission is successful. The DUT indicates that ECU #1 has the following confirmed DTCs: P0107, P0110, P0115, and P0124. The DUT indicates that ECU #2 has no confirmed DTCs.

Figure 140 - Verify an ISO 14230-4 SID \$03 confirmed DTC request with DTCs

9.3.9 Verify a SID \$04 Clear Codes Request (2 ECUs w/ Order Swap)

Test ID:	\$30204000
Purpose:	The purpose of this test is to verify that the DUT can correctly request SID \$04.
Rationale:	This test will use positive responses from two different ECUs. The order of ECU responses will be different than that of the original connection order.
Set Up:	The DUT and ECUSIM shall be in the "ISO 14230-4 (2 ECUs) Initialized State", which is detailed in 5.4.4.6.
Procedure:	
<u>ACTION- DUT</u>	Initiate the request for SID \$04 (Clear DTCs).
<u>EVALUATION</u>	Pass if the 14230_SID\$04 message was transmitted.
<u>ACTION- ECUSIM</u>	After the <i>P2</i> delay, transmit the message 14230_ECU2_SID\$04_DONE , delay <i>P2</i> , then transmit the message 14230_ECU1_SID\$04_DONE .
<u>EVALUATION</u>	Pass if the transmission is successful and the DUT indicates that DTCs have been cleared.

Figure 141 - Verify an ISO 14230-4 SID \$04 clear codes request

9.3.10 Test a SID \$04 Clear Codes Request with NRC=\$22 (2 ECUs)

Test ID:	\$30204001
Purpose:	The purpose of this test is to verify that the DUT can correctly request SID \$04 when an ECU indicates that conditions are not correct.
Rationale:	This test will use negative responses (NRC \$22) from two different ECUs.
Set Up:	The DUT and ECUSIM shall be in the "ISO 14230-4 (2 ECUs) Initialized State", which is detailed in 5.4.4.6.
Procedure:	
<u>ACTION- DUT</u>	Initiate the request for SID \$04 (Clear DTCs).
<u>EVALUATION</u>	Pass if the 14230_SID\$04 message was transmitted.
<u>ACTION- ECUSIM</u>	After the <i>P2</i> delay, transmit the message 14230_ECU1_SID\$04_NRC22 , delay <i>P2</i> , then transmit the message 14230_ECU2_SID\$04_NRC22 .
<u>EVALUATION</u>	Pass if the transmission is successful and the DUT indicates that DTCs have NOT been cleared.

Figure 142 - Test an ISO 14230-4 SID \$04 clear codes request with NRC=\$22

9.3.11 Verify a SID \$04 Clear Codes Request with NRC=\$78 (2 ECUs)

Test ID:	\$30204002
Purpose:	The purpose of this test is to verify that the DUT can correctly request SID \$04 when an ECU indicates that it is busy then eventually competes.
Rationale:	This test will use positive responses from the first ECU and a response pending (NRC \$78) from a second ECU.
Set Up:	The DUT and ECUSIM shall be in the "ISO 14230-4 (2 ECUs) Initialized State", which is detailed in 5.4.4.6.
Procedure:	
<u>ACTION- DUT</u>	Initiate the request for SID \$04 (Clear DTCs).
<u>EVALUATION</u>	Pass if the 14230_SID\$04 message was transmitted.
<u>ACTION- ECUSIM</u>	After the <i>P2</i> delay, transmit the message 14230_ECU1_SID\$04_NRC78 , delay <i>P2</i> , then transmit the message 14230_ECU2_SID\$04_DONE .
<u>EVALUATION</u>	Pass if the transmission is successful.
<u>ACTION- ECUSIM</u>	After the <i>P2_78</i> delay, transmit the message 14230_ECU1_SID\$04_DONE
<u>EVALUATION</u>	Pass if the transmission is successful and the DUT indicates that DTCs have been cleared.

Figure 143 - Verify an ISO 14230-4 SID \$04 clear codes request with NRC=\$78

9.3.12 Verify a SID \$05 TID \$01 Request (1 ECU)

Test ID:	\$30205000
Purpose:	The purpose of this test is to verify that the DUT can correctly request SID \$05 TID \$01.
Rationale:	This test will use a positive response from a single ECU.
Set Up:	The DUT and ECUSIM shall be in the “ISO 14230-4 (2 ECUs) Initialized State”, which is detailed in 5.4.4.6.
Procedure:	
<u>ACTION- DUT</u>	Initiate the request for SID \$05 TID \$01.
<u>EVALUATION</u>	Pass if the 14230_SID\$05_TID\$01 message was transmitted.
<u>ACTION- ECUSIM</u>	After the <i>P2</i> delay, transmit the message 14230_ECU1_SID\$05_TID\$01 .
<u>EVALUATION</u>	Pass if the transmission is successful and the DUT indicates that ECU #1 O2 Bank 1 Sensor 2 has a test limit of 450 mV.

Figure 144 - Verify an ISO 14230-4 SID \$05 TID \$01 request

9.3.13 Verify a SID \$06 MID Supported MID Request (1 ECU)

Test ID:	\$30206000
Purpose:	The purpose of this test is to verify that the DUT can correctly request SID \$06 MID Supported MIDs.
Rationale:	This test will use a positive response from a single ECU.
Set Up:	The DUT and ECUSIM shall be in the “ISO 14230-4 (2 ECUs) Initialized State”, which is detailed in 5.4.4.6.
Procedure:	
<u>ACTION- DUT</u>	Initiate the request for SID \$06 MID \$00 (MID Supported MIDs).
<u>EVALUATION</u>	Pass if the 14230_SID\$06_MID\$00 message was transmitted.
<u>ACTION- ECUSIM</u>	After the <i>P2</i> delay, transmit the message 14230_ECU1_SID\$06_MID\$00 .
<u>EVALUATION</u>	Pass if the transmission is successful and the DUT indicates that ECU #1 supports MIDs \$01, \$02, \$05, and \$06.

Figure 145 - Verify an ISO 14230-4 SID \$06 MID supported MID request

9.3.14 Verify a SID \$07 Pending DTC Request with No DTCs (2 ECUs w/ Order Swap)

Test ID:	\$30207000
Purpose:	The purpose of this test is to verify that the DUT can correctly request SID \$07 and process a 'no DTCs present' response.
Rationale:	This test will use positive responses from two different ECUs. The order of ECU responses will be different than that of the original connection order.
Set Up:	The DUT and ECUSIM shall be in the "ISO 14230-4 (2 ECUs) Initialized State", which is detailed in 5.4.4.6.
Procedure:	
<u>ACTION- DUT</u>	Initiate the request for SID \$07 (Pending DTCs).
<u>EVALUATION</u>	Pass if the 14230_SID\$07 message was transmitted.
<u>ACTION- ECUSIM</u>	After the <i>P2</i> delay, transmit the message 14230_ECU2_SID\$07_NoDTC , delay <i>P2</i> , then transmit the message 14230_ECU1_SID\$07_NoDTC .
<u>EVALUATION</u>	Pass if transmission is successful and the DUT indicates that there are no pending DTCs in either ECU.

Figure 146 - Verify an ISO 14230-4 SID \$07 pending DTC request with no DTCs

9.3.15 Verify a SID \$07 Pending DTC Request with DTCs (2 ECUs)

Test ID:	\$30207001
Purpose:	The purpose of this test is to verify that the DUT can correctly request SID \$07 and process a 'DTCs present' response.
Rationale:	This test will use positive responses from two different ECUs.
Set Up:	The DUT and ECUSIM shall be in the "ISO 14230-4 (2 ECUs) Initialized State", which is detailed in 5.4.4.6.
Procedure:	
<u>ACTION- DUT</u>	Initiate the request for SID \$07 (Pending DTCs).
<u>EVALUATION</u>	Pass if the 14230_SID\$07 message was transmitted.
<u>ACTION- ECUSIM</u>	After the <i>P2</i> delay, transmit the following messages (with a <i>P2</i> delay between each message): 14230_ECU1_SID\$07_DTC_M1 , 14230_ECU1_SID\$07_DTC_M2 , 14230_ECU2_SID\$07_NoDTC .
<u>EVALUATION</u>	Pass if the following is true: The transmission is successful. The DUT indicates that ECU #1 has the following pending DTCs: P0107, P0110, P0115, and P0124. The DUT indicates that ECU #2 has no pending DTCs.

Figure 147 - Verify an ISO 14230-4 SID \$07 pending DTC request with DTCs

9.3.16 Verify a SID \$08 TID Supported TID Request (1 ECU)

Test ID:	\$30208000
Purpose:	The purpose of this test is to verify that the DUT can correctly request SID \$08 TID Supported TIDs.
Rationale:	This test will use a positive response from a single ECU.
Set Up:	The DUT and ECUSIM shall be in the “ISO 14230-4 (2 ECUs) Initialized State”, which is detailed in 5.4.4.6.
Procedure:	
<u>ACTION- DUT</u>	Initiate the request for SID \$08 TID \$00 (TID Supported TIDs).
<u>EVALUATION</u>	Pass if the 14230_SID\$08_PID\$00 message was transmitted
<u>ACTION- ECUSIM</u>	After the <i>P2</i> delay, transmit the message 14230_ECU1_SID\$08_PID\$00 .
<u>EVALUATION</u>	Pass if the transmission is successful and the DUT indicates that ECU #1 supports TID \$01 (the leak test).

Figure 148 - Verify an ISO 14230-4 SID \$08 TID supported TID request

9.3.17 Verify a SID \$09 INF Supported INF Request (2 ECUs w/ Order Swap)

Test ID:	\$30209000
Purpose:	The purpose of this test is to verify that the DUT can correctly request SID \$09 INF Supported INFs.
Rationale:	This test will use positive responses from two different ECUs. The order of ECU responses will be different than that of the original connection order.
Set Up:	The DUT and ECUSIM shall be in the “ISO 14230-4 (2 ECUs) Initialized State”, which is detailed in 5.4.4.6.
Procedure:	
<u>ACTION- DUT</u>	Initiate the request for SID \$09 INF \$00 (INF Supported INFs).
<u>EVALUATION</u>	Pass if the 14230_SID\$09_PID\$00 message was transmitted.
<u>ACTION- ECUSIM</u>	After the <i>P2</i> delay, transmit the message 14230_ECU2_SID\$09_INF\$00 , delay <i>P2</i> , then transmit the message 14230_ECU1_SID\$09_INF\$00 .
<u>EVALUATION</u>	Pass if the transmission is successful and the DUT indicates that: ECU #1 supports INF \$01 (MC_VIN), INF \$02 (VIN), INF \$03 (MC_CALID), INF \$04 (CALID), INF \$05 (MC_CVN), INF \$06 (CVN), INF \$07 (MC_IPT), INF \$08 (IPT) ECU #2 supports INF \$03 (MC_CALID), INF \$04 (CALID), INF \$05 (MC_CVN), INF \$06 (CVN), INF \$07 (MC_IPT), INF \$08 (IPT)

Figure 149 - Verify an ISO 14230-4 SID \$09 INF supported INF request

9.3.18 Verify a SID \$09 INF Supported INF Request Diesel (2 ECUs w/ Order Swap)

Test ID:	\$30209001
Purpose:	The purpose of this test is to verify that the DUT can correctly request SID \$09 INF Supported INFs.
Rationale:	This test will use positive responses from two different ECUs. The order of ECU responses will be different than that of the original connection order.
Set Up:	The DUT and ECUSIM shall be in the “ISO 14230-4 (2 ECUs) Initialized State”, which is detailed in 5.4.4.6.
Procedure:	
<u>ACTION- DUT</u>	Initiate the request for SID \$09 INF \$00 (INF Supported INFs).
<u>EVALUATION</u>	Pass if the 14230_SID\$09_PID\$00 message was transmitted.
<u>ACTION- ECUSIM</u>	After the <i>P2</i> delay, transmit the message 14230_ECU2_SID\$09_INF\$00_DIESEL , delay <i>P2</i> , then transmit the message 14230_ECU1_SID\$09_INF\$00_DIESEL .
<u>EVALUATION</u>	Pass if the transmission is successful and the DUT indicates that: ECU #1 supports INF \$01 (MC_VIN), INF \$02 (VIN), INF \$03 (MC_CALID), INF \$04 (CALID), INF \$05 (MC_CVN), INF \$06 (CVN), INF \$07 (MC_IPT), INF \$0B (IPT) ECU #2 supports INF \$03 (MC_CALID), INF \$04 (CALID), INF \$05 (MC_CVN), INF \$06 (CVN), INF \$07 (MC_IPT), INF \$0B (IPT)

Figure 150 - Verify an ISO 14230-4 SID \$09 INF supported INF request

9.3.19 Verify a SID \$09 INF Supported INF Request (8 ECUs w/ Order Swap)

Test ID:	\$30209002
Purpose:	The purpose of this test is to verify that the DUT can correctly request SID \$09 INF Supported INFs.
Rationale:	This test will use positive responses from eight different ECUs. The order of ECU responses will be different than that of the original connection order.
Set Up:	The DUT and ECUSIM shall be in the “ISO 14230-4 (8 ECUs) Initialized State”, which is detailed in 5.4.4.7.
Procedure:	
<u>ACTION- DUT</u>	Initiate the request for SID \$09 INF \$00 (INF Supported INFs).
<u>EVALUATION</u>	Pass if the 14230_SID\$09_PID\$00 message was transmitted.
<u>ACTION- ECUSIM</u>	After the <i>P2</i> delay, transmit the following messages (with a <i>P2</i> delay between each message): 14230_ECU2_SID\$09_INF\$00, 14230_ECU1_SID\$09_INF\$00, 14230_ECU4_SID\$09_INF\$00, 14230_ECU3_SID\$09_INF\$00, 14230_ECU6_SID\$09_INF\$00, 14230_ECU5_SID\$09_INF\$00, 14230_ECU8_SID\$09_INF\$00, and 14230_ECU7_SID\$09_INF\$00.
<u>EVALUATION</u>	Pass if the transmission is successful and the DUT indicates that:

ECU #1 supports INF \$01 (MC_VIN), INF \$02 (VIN), INF \$03 (MC_CALID), INF \$04 (CALID), INF \$05 (MC_CVN), INF \$06 (CVN), INF \$07 (MC_IPT), INF \$08 (IPT)
ECU #2 supports INF \$03 (MC_CALID), INF \$04 (CALID), INF \$05 (MC_CVN), INF \$06 (CVN), INF \$07 (MC_IPT), INF \$08 (IPT)
ECU #3 supports INF \$03 (MC_CALID), INF \$04 (CALID), INF \$05 (MC_CVN), INF \$06 (CVN)
ECU #4 supports INF \$03 (MC_CALID), INF \$04 (CALID), INF \$05 (MC_CVN), INF \$06 (CVN)
ECU #5 supports INF \$03 (MC_CALID), INF \$04 (CALID), INF \$05 (MC_CVN), INF \$06 (CVN)
ECU #6 supports INF \$03 (MC_CALID), INF \$04 (CALID), INF \$05 (MC_CVN), INF \$06 (CVN)
ECU #7 supports INF \$03 (MC_CALID), INF \$04 (CALID), INF \$05 (MC_CVN), INF \$06 (CVN)
ECU #8 supports INF \$03 (MC_CALID), INF \$04 (CALID), INF \$05 (MC_CVN), INF \$06 (CVN)

Figure 151 - Verify an ISO 14230-4 SID \$09 INF supported INF request

9.3.20 Verify a SID \$09 VIN Request (1 ECU)

Test ID:	\$30209003
Purpose:	The purpose of this test is to verify that the DUT can correctly request SID \$09 INF \$02.
Rationale:	This test will use a positive response from a single ECU.
Set Up:	The DUT and ECUSIM shall be in the "ISO 14230-4 (2 ECUs) SID9 Ready State", which is detailed in 5.4.4.8.
Procedure:	
<u>ACTION- DUT</u>	Initiate the request for SID \$09 INF \$02 (VIN).
<u>EVALUATION</u>	Pass if the 14230_SID\$09_INF\$01 or 14230_SID\$09_INF\$02 message was transmitted.
<u>ACTION- ECUSIM</u>	If the DUT transmitted 14230_SID\$09_INF\$01 then after the <i>P2</i> delay, transmit the message 14230_ECU1_SID\$09_INF\$01 and wait for the DUT to transmit 14230_SID\$09_INF\$02 .
	If the DUT transmitted 14230_SID\$09_INF\$02 then after the <i>P2</i> delay, transmit the messages (with a <i>P2</i> delay between each message): 14230_ECU1_SID\$09_INF\$02_M1 , 14230_ECU1_SID\$09_INF\$02_M2 , 14230_ECU1_SID\$09_INF\$02_M3 , 14230_ECU1_SID\$09_INF\$02_M4 , 14230_ECU1_SID\$09_INF\$02_M5 .
<u>EVALUATION</u>	Pass if the transmission is successful and the DUT indicates that VIN is 1GYDE63A7A0000000.

Figure 152 - Verify an ISO 14230-4 SID \$09 VIN request

9.3.21 Verify a SID \$09 VIN Request with NRC=\$78 (1 ECU)

Test ID:	\$30209004
Purpose:	The purpose of this test is to verify that the DUT can correctly request SID \$09 INF \$02 when the ECU has an initial NRC = \$78.
Rationale:	This test will use a response pending (NRC \$78) from a single ECU.
Set Up:	The DUT and ECUSIM shall be in the "ISO 14230-4 (2 ECUs) SID9 Ready State", which is detailed in 5.4.4.8.
Procedure:	
<u>ACTION- DUT</u>	Initiate the request for SID \$09 INF \$02 (VIN).
<u>EVALUATION</u>	Pass if the 14230_SID\$09_INF\$01 or 14230_SID\$09_INF\$02 message was transmitted.
<u>ACTION- ECUSIM</u>	If the DUT transmits the message 14230_SID\$09_INF\$01 , then after the delay <i>P2</i> , transmit the message 14230_ECU1_SID\$09_INF\$01 . Wait for the remaining message transactions in this ACTION to be completed.
	If the DUT transmits the message 14230_SID\$09_INF\$02 , then after the delay <i>P2_MIN</i> and transmit the message 14230_ECU1_SID\$09_NRC78 .
<u>EVALUATION</u>	Pass if the 14230_ECU1_SID\$09_NRC78 message was transmitted
<u>ACTION- ECUSIM</u>	After the <i>P2</i> delay, transmit the following messages (with a <i>P2</i> delay between each message): 14230_ECU1_SID\$09_INF\$02_M1 , 14230_ECU1_SID\$09_INF\$02_M2 , 14230_ECU1_SID\$09_INF\$02_M3 , 14230_ECU1_SID\$09_INF\$02_M4 , 14230_ECU1_SID\$09_INF\$02_M5 .
<u>EVALUATION</u>	Pass if the transmission is successful and the DUT indicates that VIN is 1GYDE63A7A0000000.

Figure 153 - Verify an ISO 14230-4 SID \$09 VIN request with NRC=\$78

9.3.22 Verify a SID \$09 CALID Request (2 ECUs w/ Order Swap)

Test ID:	\$30209005
Purpose:	The purpose of this test is to verify that the DUT can correctly request SID \$09 INF \$04.
Rationale:	This test will use positive responses from two different ECUs. The order of ECU responses will be different than that of the original connection order.
Set Up:	The DUT and ECUSIM shall be in the “ISO 14230-4 (2 ECUs) SID9 Ready State”, which is detailed in 5.4.4.8.
Procedure:	
<u>ACTION- DUT</u>	Initiate the request for SID \$09 INF \$04 (CALID).
<u>EVALUATION</u>	Pass if the 14230_SID\$09_INF\$03 or 14230_SID\$09_INF\$04 message was transmitted.
<u>ACTION- ECUSIM</u>	If the DUT transmitted 14230_SID\$09_INF\$03 then after the <i>P2</i> delay, transmit the message 14230_ECU1_SID\$09_INF\$03 and wait for the DUT to transmit 14230_SID\$09_INF\$04. If the DUT transmitted 14230_SID\$09_INF\$04 then after the <i>P2</i> delay, transmit the following messages (with a <i>P2</i> delay between each message): 14230_ECU2_SID\$09_INF\$04_M1, 14230_ECU1_SID\$09_INF\$04_M1, 14230_ECU2_SID\$09_INF\$04_M2, 14230_ECU1_SID\$09_INF\$04_M2, 14230_ECU2_SID\$09_INF\$04_M3, 14230_ECU1_SID\$09_INF\$04_M3, 14230_ECU2_SID\$09_INF\$04_M4, 14230_ECU1_SID\$09_INF\$04_M4.
<u>EVALUATION</u>	Pass if the transmission is successful and the DUT indicates that the CALID for ECU #1 is 12589772 while CALID for ECU #2 is 24221419.

Figure 154 - Verify an ISO 14230-4 SID \$09 CALID request

9.3.23 Verify a SID \$09 CALID Request with 9 CALIDs from Each of 8 ECUs (8 ECUs w/ Order Swap)

Test ID:	\$30209006
Purpose:	The purpose of this test is to verify that the DUT can correctly request SID \$09 INF \$04 when 8 ECUs respond with 9 CALIDs each.
Rationale:	This test will use positive responses from eight different ECUs. The order of ECU responses will be different than that of the original connection order with ECU3 through ECU8 indicating that no SID \$01 PIDs are supported.
Set Up:	The DUT and ECUSIM shall be in the “ISO 14230-4 (8 ECUs) SID9 Ready State”, which is detailed in 5.4.4.10.
Procedure:	
<u>ACTION- DUT</u>	Initiate the request for SID \$09 INF \$04 (CALID).
<u>EVALUATION</u>	Pass if the 14230_SID\$09_INF\$03 or 14230_SID\$09_INF\$04 message was transmitted.
<u>ACTION- ECUSIM</u>	If the DUT transmitted 14230_SID\$09_INF\$03 then after the <i>P2</i> delay, transmit the following messages (with a <i>P2</i> delay between each message): 14230_ECU5_SID\$09_INF\$03, 14230_ECU2_SID\$09_INF\$03, 14230_ECU6_SID\$09_INF\$03, 14230_ECU3_SID\$09_INF\$03,

14230_ECU7_SID\$09_INF\$03, 14230_ECU4_SID\$09_INF\$03, 14230_ECU1_SID\$09_INF\$03, 14230_ECU8_SID\$09_INF\$03 and wait for the DUT to transmit **14230_SID\$09_INF\$04**.

If the DUT transmitted **14230_SID\$09_INF\$04** then after the *P2* delay, transmit the following messages (with a *P2* delay between each message): **14230_ECU5_SID\$09_INF\$04_9_M1** thru **14230_ECU5_SID\$09_INF\$04_9_M35**, **14230_ECU2_SID\$09_INF\$04_9_M1** thru **14230_ECU2_SID\$09_INF\$04_9_M35**, **14230_ECU6_SID\$09_INF\$04_9_M1** thru **14230_ECU6_SID\$09_INF\$04_9_M35**, **14230_ECU3_SID\$09_INF\$04_9_M1** thru **14230_ECU3_SID\$09_INF\$04_9_M35**, **14230_ECU7_SID\$09_INF\$04_9_M1** thru **14230_ECU7_SID\$09_INF\$04_9_M35**, **14230_ECU4_SID\$09_INF\$04_9_M1** thru **14230_ECU4_SID\$09_INF\$04_9_M35**, **14230_ECU1_SID\$09_INF\$04_9_M1** thru **14230_ECU1_SID\$09_INF\$04_9_M35**, **14230_ECU8_SID\$09_INF\$04_9_M1** thru **14230_ECU8_SID\$09_INF\$04_9_M35**.

EVALUATION

Pass if the following is true:

All Transmissions are successful.

The DUT indicates that the CALID for ECU #1 are: "11589778", "21589777", "31589776", "41589775", "51589774", "61589773", "71589772", "81589771", "91589770".

The DUT indicates that the CALID for ECU #2 are: "12589778", "22589777", "32589776", "42589775", "52589774", "62589773", "72589772", "82589771", "92589770".

The DUT indicates that the CALID for ECU #3 are: "13589778", "23589777", "33589776", "43589775", "53589774", "63589773", "73589772", "83589771", "93589770".

The DUT indicates that the CALID for ECU #4 are: "14589778", "24589777", "34589776", "44589775", "54589774", "64589773", "74589772", "84589771", "94589770".

The DUT indicates that the CALID for ECU #5 are: "15589778", "25589777", "35589776", "45589775", "55589774", "65589773", "75589772", "85589771", "95589770".

The DUT indicates that the CALID for ECU #6 are: "16589778", "26589777", "36589776", "46589775", "56589774", "66589773", "76589772", "86589771", "96589770".

The DUT indicates that the CALID for ECU #7 are: "17589778", "27589777", "37589776", "47589775", "57589774", "67589773", "77589772", "87589771", "97589770".

The DUT indicates that the CALID for ECU #8 are: "18589778", "28589777", "38589776", "48589775", "58589774", "68589773", "78589772", "88589771", "98589770".

Figure 155 - Verify an ISO 14230-4 SID \$09 CALID request with 9 CALIDs on an ECU

9.3.24 Verify a SID \$09 CVN Request (2 ECU)

Test ID:	\$30209007
Purpose:	The purpose of this test is to verify that the DUT can correctly request SID \$09 INF \$06.
Rationale:	This test will use positive responses from a two ECUs.
Set Up:	The DUT and ECUSIM shall be in the “ISO 14230-4 (2 ECUs) SID9 Ready State”, which is detailed in 5.4.4.8.
Procedure:	
<u>ACTION- DUT</u>	Initiate the request for SID \$09 INF \$06 (CVN).
<u>EVALUATION</u>	Pass if the 14230_SID\$09_INF\$05 or 14230_SID\$09_INF\$06 message was transmitted.
<u>ACTION- ECUSIM</u>	
If the DUT transmitted 14230_SID\$09_INF\$05 then after the <i>P2</i> delay, transmit the following messages (with a <i>P2</i> delay between each message): 14230_ECU1_SID\$09_INF\$05 , 14230_ECU2_SID\$09_INF\$05 and wait for the DUT to transmit 14230_SID\$09_INF\$06 .	
If the DUT transmitted 14230_SID\$09_INF\$06 then after the <i>P2</i> delay, transmit the following messages (with a <i>P2</i> delay between each message): 14230_ECU1_SID\$09_INF\$06 and 14230_ECU2_SID\$09_INF\$06 .	
<u>EVALUATION</u>	Pass if the transmission is successful and the DUT indicates that the CVN for ECU #1 is \$1791BC88 and ECU #2 is \$2791BC88.

Figure 156 - Verify an ISO 14230-4 SID \$09 CVN request

9.3.25 Verify a SID \$09 CVN Request with 9 CVNs (8 ECUs w/ Order Swap)

Test ID:	\$30209008
Purpose:	The purpose of this test is to verify that the DUT can correctly request SID \$09 INF \$06 when 8 ECUs responds with 9 CVNs each.
Rationale:	This test will use positive responses from eight different ECUs. The order of ECU responses will be different than that of the original connection order with ECU3 through ECU8 indicating that no SID \$01 PIDs are supported.
Set Up:	The DUT and the ECUSIM shall be in the “ISO 14230-4 (8 ECUs) SID9 Ready State”, which is detailed in 5.4.4.10.
Procedure:	
<u>ACTION- DUT</u>	Initiate the request for SID \$09 INF \$06 (CVN).
<u>EVALUATION</u>	Pass if the 14230_SID\$09_INF\$05 or 14230_SID\$09_INF\$06 message was transmitted.
<u>ACTION- ECUSIM</u>	
If the DUT transmitted 14230_SID\$09_INF\$05 then after the <i>P2</i> delay, transmit the following messages (with a <i>P2</i> delay between each message): 14230_ECU5_SID\$09_INF\$05 , 14230_ECU2_SID\$09_INF\$05 , 14230_ECU6_SID\$09_INF\$05 , 14230_ECU3_SID\$09_INF\$05 , 14230_ECU7_SID\$09_INF\$05 , 14230_ECU4_SID\$09_INF\$05 , 14230_ECU1_SID\$09_INF\$05 , 14230_ECU8_SID\$09_INF\$05 and wait for the DUT to transmit 14230_SID\$09_INF\$06 .	

If the DUT transmitted **14230_SID\$09_INF\$06** then after the *P2* delay, transmit the following messages (with a *P2* delay between each message): **14230_ECU8_SID\$09_INF\$06_9_M1** to **14230_ECU8_SID\$09_INF\$06_9_M9**, **14230_ECU1_SID\$09_INF\$06_9_M1** to **14230_ECU1_SID\$09_INF\$06_9_M9**, **14230_ECU7_SID\$09_INF\$06_9_M1** to **14230_ECU7_SID\$09_INF\$06_9_M9**, **14230_ECU2_SID\$09_INF\$06_9_M1** to **14230_ECU2_SID\$09_INF\$06_9_M9**, **14230_ECU6_SID\$09_INF\$06_9_M1** to **14230_ECU6_SID\$09_INF\$06_9_M9**, **14230_ECU3_SID\$09_INF\$06_9_M1** to **14230_ECU3_SID\$09_INF\$06_9_M9**, **14230_ECU5_SID\$09_INF\$06_9_M1** to **14230_ECU5_SID\$09_INF\$06_9_M9**, **14230_ECU4_SID\$09_INF\$06_9_M1** to **14230_ECU4_SID\$09_INF\$06_9_M9**.

EVALUATION

Pass if the following is true:

Transmission is successful.

The DUT indicates that the CVN for ECU #1 is \$1791BC88, \$1891BC87, \$1991BC86, \$1A91BC85, \$1B91BC84, \$1C91BC83, \$1D91BC82, \$1E55AA81, \$1FFF0080.

The DUT indicates that the CVN for ECU #2 is \$2791BC88, \$2891BC87, \$2991BC86, \$2A91BC85, \$2B91BC84, \$2C91BC83, \$2D91BC82, \$2E55AA81, \$2FFF0080.

The DUT indicates that the CVN for ECU #3 is \$3791BC88, \$3891BC87, \$3991BC86, \$3A91BC85, \$3B91BC84, \$3C91BC83, \$3D91BC82, \$3E55AA81, \$3FFF0080.

The DUT indicates that the CVN for ECU #4 is \$4791BC88, \$4891BC87, \$4991BC86, \$4A91BC85, \$4B91BC84, \$4C91BC83, \$4D91BC82, \$4E55AA81, \$4FFF0080.

The DUT indicates that the CVN for ECU #5 is \$5791BC88, \$5891BC87, \$5991BC86, \$5A91BC85, \$5B91BC84, \$5C91BC83, \$5D91BC82, \$5E55AA81, \$5FFF0080.

The DUT indicates that the CVN for ECU #6 is \$6791BC88, \$6891BC87, \$6991BC86, \$6A91BC85, \$6B91BC84, \$6C91BC83, \$6D91BC82, \$6E55AA81, \$6FFF0080.

The DUT indicates that the CVN for ECU #7 is \$7791BC88, \$7891BC87, \$7991BC86, \$7A91BC85, \$7B91BC84, \$7C91BC83, \$7D91BC82, \$7E55AA81, \$7FFF0080.

The DUT indicates that the CVN for ECU #8 is \$8791BC88, \$8891BC87, \$8991BC86, \$8A91BC85, \$8B91BC84, \$8C91BC83, \$8D91BC82, \$8E55AA81, \$8FFF0080.

Figure 157 - Verify an ISO 14230-4 SID \$09 CVN request with 9 CVNs on an ECU

9.3.26 Verify a SID \$09 IPT (INF\$08, 32 bytes) Request (2 ECUs w/ Order Swap)

Test ID:	\$30209009
Purpose:	The purpose of this test is to verify that the DUT can correctly request SID \$09 INF \$08 (32 bytes).
Rationale:	This test will use positive responses from two ECUs. The order of ECU responses will be different than that of the original connection order.
Set Up:	The DUT and ECUSIM shall be in the "ISO 14230-4 (2 ECUs) SID9 Ready State", which is detailed in 5.4.4.8.
Procedure:	
<u>ACTION- DUT</u>	Initiate the request for SID \$09 INF \$08 (IPT).
<u>EVALUATION</u>	Pass if the 14230_SID\$09_INF\$07 or 14230_SID\$09_INF\$08 message was transmitted.
<u>ACTION- ECUSIM</u>	If the DUT transmitted 14230_SID\$09_INF\$07 then after the <i>P2</i> delay, transmit the following messages (with a <i>P2</i> delay between each message): 14230_ECU2_SID\$09_INF\$07_832, 14230_ECU1_SID\$09_INF\$07_832 and wait for the DUT to transmit 14230_SID\$09_INF\$08. If the DUT transmitted 14230_SID\$09_INF\$08 then after the <i>P2</i> delay, transmit the following messages (with a <i>P2</i> delay between each message): 14230_ECU2_SID\$09_INF\$08_32_M1

<u>EVALUATION</u>	thru 14230_ECU2_SID\$09_INF\$08_32_M8, 14230_ECU1_SID\$09_INF\$08_32_M1 thru 14230_ECU1_SID\$09_INF\$08_32_M8.
	Pass if the following is true: Transmission is successful. The DUT indicates that the IPT for ECU #1 is 32 bytes and has the following values: OBDCOND = 100 IGNCNTR = 105 CATCOMP1 = 10 CATCOND1 = 15 CATCOMP2 = 00 CATCOND2 = 00 O2COMP1 = 30 O2COND1 = 35 O2COMP2 = 00 O2COND2 = 00 EGRCOMP = 50 EGRCOND = 55 AIRCOMP = 60 AIRCOND = 65 EVAPCOND = 70 EVAPCOND = 75 The DUT indicates that the IPT for ECU #2 is 32 bytes and has the following values: OBDCOND = 100 IGNCNTR = 105 CATCOMP1 = 00 CATCOND1 = 00 CATCOMP2 = 20 CATCOND2 = 25 O2COMP1 = 00 O2COND1 = 00 O2COMP2 = 40 O2COND2 = 45 EGRCOMP = 00 EGRCOND = 00 AIRCOMP = 00 AIRCOND = 00 EVAPCOND = 00 EVAPCOND = 00

Figure 158 - Verify an ISO 14230-4 SID \$09 IPT (INF\$08, 32 bytes) request (11-bit, 500K)

9.3.27 Verify a SID \$09 IPT (INF\$08, 40 bytes) Request (2 ECUs w/ Order Swap)

Test ID:	\$3020900A
Purpose:	The purpose of this test is to verify that the DUT can correctly request SID \$09 INF \$08 (40 bytes).
Rationale:	This test will use positive responses from two ECUs. The order of ECU responses will be different than that of the original connection order.
Set Up:	The DUT and ECUSIM shall be in the "ISO 14230-4 (2 ECUs) SID9 Ready State", which is detailed in 5.4.4.8.
Procedure:	
<u>ACTION- DUT</u>	Initiate the request for SID \$09 INF \$08 (IPT).
<u>EVALUATION</u>	Pass if the 14230_SID\$09_INF\$07 or 14230_SID\$09_INF\$08 message was transmitted.
<u>ACTION- ECUSIM</u>	If the DUT transmitted 14230_SID\$09_INF\$07 then after the <i>P2</i> delay, transmit the following messages (with a <i>P2</i> delay between each message): 14230_ECU2_SID\$09_INF\$07_840, 14230_ECU1_SID\$09_INF\$07_840 and wait for the DUT to transmit 14230_SID\$09_INF\$08. If the DUT transmitted 14230_SID\$09_INF\$08 then after the <i>P2</i> delay, transmit the following messages (with a <i>P2</i> delay between each message): 14230_ECU2_SID\$09_INF\$08_40_M1 thru 14230_ECU2_SID\$09_INF\$08_40_M10, 14230_ECU1_SID\$09_INF\$08_40_M1 thru 14230_ECU1_SID\$09_INF\$08_40_M10.
<u>EVALUATION</u>	Pass if the following is true: Transmission is successful. The DUT indicates that the IPT for ECU #1 is 40 bytes and has the following values: OBDCOND = 100 IGNCNTR = 105 CATCOMP1 = 10 CATCOND1 = 15 CATCOMP2 = 00 CATCOND2 = 00 O2COMP1 = 30 O2COND1 = 35 O2COMP2 = 00 O2COND2 = 00 EGRCOMP = 50 EGRCOND = 55 AIRCOMP = 60 AIRCOND = 65 EVAPCOND = 70 EVAPCOND = 75 SO2SCOMP1 = 90 SO2SCOND1 = 95 SO2SCOMP2 = 00 SO2SCOND2 = 00 The DUT indicates that the IPT for ECU #2 is 40 bytes and has the following values: OBDCOND = 100 IGNCNTR = 105 CATCOMP1 = 00 CATCOND1 = 00 CATCOMP2 = 20 CATCOND2 = 25

O2COMP1 = 00
 O2COND1 = 00
 O2COMP2 = 40
 O2COND2 = 45
 EGRCOMP = 00
 EGRCOND = 00
 AIRCOMP = 00
 AIRCOND = 00
 EVAPCOND = 00
 EVAPCOND = 00
 SO2SCOMP1 = 00
 SO2SCOND1 = 00
 SO2SCOMP2 = 90
 SO2SCOND2 = 95

Figure 159 - Verify an ISO 14230-4 SID \$09 IPT (INF\$08, 40 bytes) request

9.3.28 Verify a SID \$09 IPT (INF\$0B, 32 bytes) Request (2 ECUs w/ Order Swap)

Test ID:	\$3020900B
Purpose:	The purpose of this test is to verify that the DUT can correctly request SID \$09 INF \$0B (32 bytes).
Rationale:	This test will use positive responses from two ECUs. The order of ECU responses will be different than that of the original connection order.
Set Up:	The DUT and ECUSIM shall be in the "ISO 14230-4 (2 ECUs) SID9 Diesel Ready State", which is detailed in 5.4.4.9.
Procedure:	
<u>ACTION- DUT</u>	Initiate the request for SID \$09 INF \$0B (IPT).
<u>EVALUATION</u>	Pass if the 14230_SID\$09_INF\$07 or 14230_SID\$09_INF\$0B message was transmitted.
<u>ACTION- ECUSIM</u>	If the DUT transmitted 14230_SID\$09_INF\$07 then after the <i>P2</i> delay, transmit the following messages (with a <i>P2</i> delay between each message): 14230_ECU2_SID\$09_INF\$07_B32, 14230_ECU1_SID\$09_INF\$07_B32 and wait for the DUT to transmit 14230_SID\$09_INF\$08. If the DUT transmitted 14230_SID\$09_INF\$0B then after the <i>P2</i> delay, transmit the following messages (with a <i>P2</i> delay between each message): 14230_ECU2_SID\$09_INF\$0B_32_M1 thru 14230_ECU2_SID\$09_INF\$0B_32_M8, 14230_ECU1_SID\$09_INF\$0B_32_M1 thru 14230_ECU1_SID\$09_INF\$0B_32_M8.
<u>EVALUATION</u>	Pass if the following is true: Transmission is successful. The DUT indicates that the IPT for ECU #1 is 32 bytes and has the following values: OBDCOND = 100 IGNCNTR = 105 HCCATCOMP1 = 10 HCCATCOND1 = 15 NCATCOMP2 = 00 NCATCOND2 = 00 NADSCOMP1 = 00 NADSCOND1 = 00 PMCOMP2 = 00 PMCOND2 = 00 EGSCOMP = 50

EGSCOND = 55
 EGRCOMP = 60
 EGRCOND = 65
 BPCOND = 70
 BPCOND = 75

The DUT indicates that the IPT for ECU #2 is 32 bytes and has the following values:

OBDCOND = 100
 IGNCNTR = 105
 HCCATCOMP1 = 00
 HCCATCOND1 = 00
 NCATCOMP2 = 20
 NCATCOND2 = 25
 NADSCOMP1 = 00
 NADSCOND1 = 00
 PMCOMP2 = 40
 PMCOND2 = 45
 EGSCOMP = 00
 EGSCOND = 00
 EGRCOMP = 00
 EGRCOND = 00
 BPCOND = 00
 BPCOND = 00

Figure 160 - Verify an ISO 14230-4 SID \$09 IPT (INF\$0B, 32 bytes) request

9.3.29 Verify a SID \$09 IPT (INF\$0B, 36 bytes) Request (2 ECUs w/ Order Swap)

Test ID:	\$3020900C
Purpose:	The purpose of this test is to verify that the DUT can correctly request SID \$09 INF \$0B (36 bytes).
Rationale:	This test will use positive responses from two ECUs. The order of ECU responses will be different than that of the original connection order.
Set Up:	The DUT and ECUSIM shall be in the "ISO 14230-4 (2 ECUs) SID9 Diesel Ready State", which is detailed in 5.4.4.9.
Procedure:	
<u>ACTION- DUT</u>	Initiate the request for SID \$09 INF \$0B (IPT).
<u>EVALUATION</u>	Pass if the 14230_SID\$09_INF\$07 or 14230_SID\$09_INF\$0B message was transmitted.
<u>ACTION- ECUSIM</u>	If the DUT transmitted 14230_SID\$09_INF\$07 then after the <i>P2</i> delay, transmit the following messages (with a <i>P2</i> delay between each message): 14230_ECU2_SID\$09_INF\$07_B36, 14230_ECU1_SID\$09_INF\$07_B36 and wait for the DUT to transmit 14230_SID\$09_INF\$08. If the DUT transmitted 14230_SID\$09_INF\$0B then after the <i>P2</i> delay, transmit the following messages (with a <i>P2</i> delay between each message): 14230_ECU2_SID\$09_INF\$0B_36_M1 thru 14230_ECU2_SID\$09_INF\$0B_36_M9, 14230_ECU1_SID\$09_INF\$0B_36_M1 thru 14230_ECU1_SID\$09_INF\$0B_36_M9.
<u>EVALUATION</u>	Pass if the following is true: Transmission is successful. The DUT indicates that the IPT for ECU #1 is 36 bytes and has the following values: OBDCOND = 100 IGNCNTR = 105

HCCATCOMP1 = 10
HCCATCOND1 = 15
NCATCOMP2 = 00
NCATCOND2 = 00
NADSCOMP1 = 00
NADSCOND1 = 00
PMCOMP2 = 00
PMCOND2 = 00
EGSCOMP = 50
EGSCOND = 55
EGRCOMP = 60
EGRCOND = 65
BPCOND = 70
BPCOND = 75
FUELCOND = 80
FUELCOND = 85

The DUT indicates that the IPT for ECU #2 is 36 bytes and has the following values:

OBDCOND = 100
IGNCNTR = 105
HCCATCOMP1 = 00
HCCATCOND1 = 00
NCATCOMP2 = 20
NCATCOND2 = 25
NADSCOMP1 = 00
NADSCOND1 = 00
PMCOMP2 = 40
PMCOND2 = 45
EGSCOMP = 00
EGSCOND = 00
EGRCOMP = 00
EGRCOND = 00
BPCOND = 00
BPCOND = 00
FUELCOND = 00
FUELCOND = 00

Figure 161 - Verify an ISO 14230-4 SID \$09 IPT (INF\$0B, 36 bytes) request

9.4 ISO 9141-2 Tests

These network tests are specific to ISO 9141-2. Unless otherwise specified, all references to Electrical Connections, ECU Addresses, Messages, Message Timing, and pre-defined states will be as described in 5.4.4.7.

9.4.1 Verify a SID \$01 PID Supported PIDs Requests (1 ECU)

Test ID:	\$30301000
Purpose:	The purpose of this test is to verify that the DUT can correctly request a SID \$01 PID Supported PIDs.
Rationale:	This test will use positive responses from a single different ECU.
Set Up:	The DUT and ECUSIM shall be in the “ISO 9141-2 (2 ECUs) Initialized State”, which is detailed in 5.4.5.6.
Procedure:	
ACTION- DUT	Initiate the request for SID \$01 PID Supported PIDs.

EVALUATION	Pass if the 9141_SID\$01_PID\$00 or 9141_SID\$01_PID\$20 or 9141_SID\$01_PID\$40 message was transmitted.
ACTION- ECUSIM	If the DUT transmitted 9141_SID\$01_PID\$00 then after the <i>P2</i> delay, transmit 9141_ECU1_SID\$01_PID\$00_20, delay <i>P2</i> and transmit 9141_ECU2_SID\$01_PID\$00. Wait for the remaining message transactions in this ACTION to be completed. If the DUT transmitted 9141_SID\$01_PID\$20 then after the <i>P2</i> delay, transmit 9141_ECU1_SID\$01_PID\$20, and wait for the remaining message transactions in this ACTION to be completed. If the DUT transmitted 9141_SID\$01_PID\$40 then after the <i>P2</i> delay, transmit 9141_ECU1_SID\$01_PID\$40, and wait for the remaining message transactions in this ACTION to be completed.
EVALUATION	Pass if all transmissions by the DUT and ECUSIM were successful and the DUT indicates that: ECU #1 supports PIDs \$01(Readiness Bits), \$0C (RPM), and \$41 (Monitor Status this drive cycle) are supported. ECU #2 supports PIDs \$01(Readiness Bits) and \$0C (RPM) are supported.

Figure 162 - Verify an ISO 9141-2 SID \$01 PID supported PID request

9.4.2 Verify a SID \$01 PID \$01 Request for Spark Ignition (2 ECUs w/ Order Swap)

Test ID:	\$30301001
Purpose:	The purpose of this test is to verify that the DUT can correctly request a SID \$01 PID, which the ECUSIM indicates is supported.
Rationale:	This test will use positive responses from two different ECUs. The order of ECU responses will be different than that of the original connection order. This test will also verify that the DUT can differentiate a spark ignition response from a compression ignition response.
Set Up:	The DUT and ECUSIM shall be in the "ISO 9141-2 (2 ECUs) Initialized State", which is detailed in 5.4.5.6.
Procedure:	
ACTION- DUT	Initiate the request for SID \$01 PID \$01 (I/M Readiness Bits).
EVALUATION	Pass if the 9141_SID\$01_PID\$01 message was transmitted.
ACTION- ECUSIM	After the <i>P2</i> delay, transmit the message 9141_ECU2_SID\$01_PID\$01_SPARK , delay <i>P2</i> , then transmit the message 9141_ECU1_SID\$01_PID\$01_SPARK .
EVALUATION	Pass if the following is true: Transmission is successful. The DUT indicates that ECU #1 has the following values: MIL is OFF DCT COUNT is 0 SPARK IGNITION MONITORS are SUPPORTED MISFIRE is SUPPORTED and READY FUEL SYSTEM MONITORING is SUPPORTED and READY COMPREHENSIVE COMPONENT MONITORING is SUPPORTED and READY CATALYST MONITORING is SUPPORTED and NOT READY HEATED CATALYST MONITORING is SUPPORTED and NOT READY

EVAPORATIVE SYSTEM MONITORING is SUPPORTED and NOT READY
 SECONDARY AIR SYSTEM MONITORING is SUPPORTED and NOT READY
 OXYGEN SENSOR MONITORING is SUPPORTED and NOT READY
 OXYGEN SENSOR HEATER MONITORING is SUPPORTED and NOT READY
 EGR/VVT SYSTEM MONITORING is SUPPORTED and NOT READY

The DUT indicates that ECU #2 has the following values:

MIL is ON

DCT COUNT is 1

SPARK IGNITION MONITORS are SUPPORTED

COMPREHENSIVE COMPONENT MONITORING is SUPPORTED and NOT READY

Figure 163 - Verify an ISO 9141-2 SID \$01 PID \$01 request for spark ignition

9.4.3 Verify a SID \$01 PID \$01 Request for Compression Ignition (2 ECUs w/ Order Swap)

Test ID:	\$30301002
Purpose:	The purpose of this test is to verify that the DUT can correctly request a SID \$01 PID, which the ECUSIM indicates is supported.
Rationale:	This test will use positive responses from two different ECUs. The order of ECU responses will be different than that of the original connection order. This test will also verify that the DUT can differentiate a spark ignition response from a compression ignition response.
Set Up:	The DUT and ECUSIM shall be in the "ISO 9141-2 (2 ECUs) Initialized State", which is detailed in 5.4.5.6.
Procedure:	
<u>ACTION- DUT</u>	Initiate the request for SID \$01 PID \$01 (I/M Readiness Bits).
<u>EVALUATION</u>	Pass if the 9141_SID\$01_PID\$01 message was transmitted.
<u>ACTION- ECUSIM</u>	After the P2 delay, transmit the message 9141_ECU2_SID\$01_PID\$01_COMP , delay P2, then transmit the message 9141_ECU1_SID\$01_PID\$01_COMP .
<u>EVALUATION</u>	Pass if the following is true: Transmission is successful. The DUT indicates that ECU #1 has the following values: MIL is OFF DCT COUNT is 0 COMPRESSION IGNITION MONITORS are SUPPORTED MISFIRE is SUPPORTED and READY FUEL SYSTEM MONITORING is SUPPORTED and READY COMPREHENSIVE COMPONENT MONITORING is SUPPORTED and READY NMHC MONITORING is SUPPORTED and NOT READY NOX AFTERTREATMENT MONITORING is SUPPORTED and NOT READY BOOST PRESSURE SYSTEM MONITORING is SUPPORTED and NOT READY EXHAUST GAS SENSOR MONITORING is SUPPORTED and NOT READY PM FILTER MONITORING is SUPPORTED and NOT READY EGR/VVT SYSTEM MONITORING is SUPPORTED and NOT READY The DUT indicates that ECU #2 has the following values: MIL is ON DCT COUNT is 1 COMPRESSION IGNITION MONITORS are SUPPORTED COMPREHENSIVE COMPONENT MONITORING is SUPPORTED and NOT READY

Figure 164 - Verify an ISO 9141-2 SID \$01 PID \$01 request for compression ignition

9.4.4 Verify a SID \$01 PID \$0C Request (2 ECUs w/ Order Swap)

Test ID:	\$30301003
Purpose:	The purpose of this test is to verify that the DUT can correctly request a SID \$01 PID, which the ECUSIM indicates is supported.
Rationale:	This test will use positive responses from two different ECUs. The order of ECU responses will be different than that of the original connection order.
Set Up:	The DUT and ECUSIM shall be in the “ISO 9141-2 (2 ECUs) Initialized State”, which is detailed in 5.4.5.6.
Procedure:	
<u>ACTION- DUT</u>	Initiate the request for SID \$01 PID \$0C (RPM).
<u>EVALUATION</u>	Pass if the 9141_SID\$01_PID\$0C message was transmitted.
<u>ACTION- ECUSIM</u>	After the <i>P2</i> delay, transmit the message 9141_ECU2_SID\$01_PID\$0C_KOEO , delay <i>P2</i> , then transmit the message 9141_ECU1_SID\$01_PID\$0C_KOEO .
<u>EVALUATION</u>	Pass if transmission is successful and the DUT indicates that engine RPM is 0.

Figure 165 - Verify an ISO 9141-2 SID \$01 PID \$0C request

9.4.5 Verify a SID \$02 PID Freeze Frame DTC Request with No DTCs (2 ECUs w/ Order Swap)

Test ID:	\$30302000
Purpose:	The purpose of this test is to verify that the DUT can correctly request SID \$02 PID \$02 (indicating that there is no Freeze Frame DTC), which the ECUSIM indicates is supported.
Rationale:	This test will use positive responses from two different ECUs. The order of ECU responses will be different than that of the original connection order.
Set Up:	The DUT and ECUSIM shall be in the “ISO 9141-2 (2 ECUs) Initialized State”, which is detailed in 5.4.5.6.
Procedure:	
<u>ACTION- DUT</u>	Initiate the request for SID \$02 PID \$02 (the Freeze Frame DTC).
<u>EVALUATION</u>	Pass if the 9141_SID\$02_PID\$02 message was transmitted.
<u>ACTION- ECUSIM</u>	After the <i>P2</i> delay, transmit the message 9141_ECU2_SID\$02_PID\$02_NoDTC , delay <i>P2</i> , then transmit the message 9141_ECU1_SID\$02_PID\$02_NoDTC .
<u>EVALUATION</u>	Pass if transmission is successful and the DUT indicates that there is no Freeze Frame DTC in either ECU.

Figure 166 - Verify an ISO 9141-2 SID \$02 PID freeze frame DTC request with no DTCs

9.4.6 Verify a SID \$02 PID Freeze Frame DTC Request with DTCs (2 ECUs)

Test ID:	\$30302001
Purpose:	The purpose of this test is to verify that the DUT can correctly request SID \$02 PID \$02 (indicating that there is a Freeze Frame DTC), which the ECUSIM indicates is supported.
Rationale:	This test will use positive responses from two different ECUs.
Set Up:	The DUT and ECUSIM shall be in the “ISO 9141-2 (2 ECUs) Initialized State”, which is detailed in 5.4.5.6.
Procedure:	
<u>ACTION- DUT</u>	Initiate the request for SID \$02 PID \$02 (the Freeze Frame DTC).
<u>EVALUATION</u>	Pass if the 9141_SID\$02_PID\$02 message was transmitted.
<u>ACTION- ECUSIM</u>	After the <i>P2</i> delay, transmit the message 9141_ECU1_SID\$02_PID\$02_DTC , delay <i>P2</i> , then transmit the message 9141_ECU2_SID\$02_PID\$02_NoDTC .
<u>EVALUATION</u>	Pass if the following is true: The transmission is successful. The DUT indicates that ECU #1 has a Freeze Frame DTC of P0107 and ECU #2 has no Freeze Frame DTC.

Figure 167 - Verify an ISO 9141-2 SID \$02 PID freeze frame DTC request with DTCs

9.4.7 Verify a SID \$03 Confirmed DTC Request with No DTCs (2 ECUs w/ Order Swap)

Test ID:	\$30303000
Purpose:	The purpose of this test is to verify that the DUT can correctly request SID \$03 and process a ‘no DTCs present’ response.
Rationale:	This test will use positive responses from two different ECUs. The order of ECU responses will be different than that of the original connection order.
Set Up:	The DUT and ECUSIM shall be in the “ISO 9141-2 (2 ECUs) Initialized State”, which is detailed in 5.4.5.6.
Procedure:	
<u>ACTION- DUT</u>	Initiate the request for SID \$03 (Confirmed DTCs).
<u>EVALUATION</u>	Pass if the 9141_SID\$03 message was transmitted.
<u>ACTION- ECUSIM</u>	After the <i>P2</i> delay, transmit the message 9141_ECU2_SID\$03_NoDTC , delay <i>P2</i> , then transmit the message 9141_ECU1_SID\$03_NoDTC .
<u>EVALUATION</u>	Pass if transmission is successful and the DUT indicates that there are no confirmed DTCs in either ECU.

Figure 168 - Verify an ISO 9141-2 SID \$03 confirmed DTC request with no DTCs

9.4.8 Verify a SID \$03 Confirmed DTC Request with DTCs (2 ECUs)

Test ID:	\$30303001
Purpose:	The purpose of this test is to verify that the DUT can correctly request SID \$03 and process a 'DTCs present' response.
Rationale:	This test will use positive responses from two different ECUs.
Set Up:	The DUT and ECUSIM shall be in the "ISO 9141-2 (2 ECUs) Initialized State", which is detailed in 5.4.5.6.
Procedure:	
<u>ACTION- DUT</u>	Initiate the request for SID \$03 (Confirmed DTCs).
<u>EVALUATION</u>	Pass if the 9141_SID\$03 message was transmitted.
<u>ACTION- ECUSIM</u>	After the <i>P2</i> delay, transmit the following messages (with a <i>P2</i> delay between each message): 9141_ECU1_SID\$03_DTC_M1, 9141_ECU1_SID\$03_DTC_M2, 9141_ECU2_SID\$03_NoDTC.
<u>EVALUATION</u>	Pass if the following is true: The transmission is successful. The DUT indicates that ECU #1 has the following confirmed DTCs: P0107, P0110, P0115, and P0124. The DUT indicates that ECU #2 has no confirmed DTCs.

Figure 169 - Verify an ISO 9141-2 SID \$03 confirmed DTC request with DTCs

9.4.9 Verify a SID \$04 Clear Codes Request (2 ECUs w/ Order Swap)

Test ID:	\$30304000
Purpose:	The purpose of this test is to verify that the DUT can correctly request SID \$04.
Rationale:	This test will use positive responses from two different ECUs. The order of ECU responses will be different than that of the original connection order.
Set Up:	The DUT and ECUSIM shall be in the "ISO 9141-2 (2 ECUs) Initialized State", which is detailed in 5.4.5.6.
Procedure:	
<u>ACTION- DUT</u>	Initiate the request for SID \$04 (Clear DTCs).
<u>EVALUATION</u>	Pass if the 9141_SID\$04 message was transmitted.
<u>ACTION- ECUSIM</u>	After the <i>P2</i> delay, transmit the message 9141_ECU2_SID\$04_DONE , delay <i>P2</i> , then transmit the message 9141_ECU1_SID\$04_DONE .
<u>EVALUATION</u>	Pass if the transmission is successful and the DUT indicates that DTCs have been cleared.

Figure 170 - Verify an ISO 9141-2 SID \$04 clear codes request

9.4.10 Test a SID \$04 Clear Codes Request with NRC=\$22 (2 ECUs)

Test ID:	\$30304001
Purpose:	The purpose of this test is to verify that the DUT can correctly request SID \$04 when an ECU indicates that conditions are not correct.
Rationale:	This test will use negative responses (NRC \$22) from two different ECUs.
Set Up:	The DUT and ECUSIM shall be in the “ISO 9141-2 (2 ECUs) Initialized State”, which is detailed in 5.4.5.6.
Procedure:	
<u>ACTION- DUT</u>	Initiate the request for SID \$04 (Clear DTCs).
<u>EVALUATION</u>	Pass if the 9141_SID\$04 message was transmitted.
<u>ACTION- ECUSIM</u>	After the <i>P2</i> delay, transmit the message 9141_ECU1_SID\$04_NRC22 , delay <i>P2</i> , then transmit the message 9141_ECU2_SID\$04_NRC22 .
<u>EVALUATION</u>	Pass if the transmission is successful and the DUT indicates that DTCs have NOT been cleared.

Figure 171 - Test an ISO 9141-2 SID \$04 clear codes request with NRC=\$22

9.4.11 Verify a SID \$04 Clear Codes Request with NRC=\$78 (2 ECUs)

Test ID:	\$30304002
Purpose:	The purpose of this test is to verify that the DUT can correctly request SID \$04 when an ECU indicates that it is busy then eventually competes.
Rationale:	This test will use positive responses from the first ECU and a response pending (NRC \$78) from a second ECU.
Set Up:	The DUT and ECUSIM shall be in the “ISO 9141-2 (2 ECUs) Initialized State”, which is detailed in 5.4.5.6.
Procedure:	
<u>ACTION- DUT</u>	Initiate the request for SID \$04 (Clear DTCs).
<u>EVALUATION</u>	Pass if the 9141_SID\$04 message was transmitted.
<u>ACTION- ECUSIM</u>	After the <i>P2</i> delay, transmit the message 9141_ECU1_SID\$04_NRC78 , delay <i>P2</i> , then transmit the message 9141_ECU2_SID\$04_DONE .
<u>EVALUATION</u>	Pass if the transmission is successful.
<u>ACTION- ECUSIM</u>	After the <i>P2_78</i> delay, transmit the message 9141_ECU1_SID\$04_DONE
<u>EVALUATION</u>	Pass if the transmission is successful and the DUT indicates that DTCs have been cleared.

Figure 172 - Verify an ISO 9141-2 SID \$04 clear codes request with NRC=\$78

9.4.12 Verify a SID \$05 TID \$01 Request (1 ECU)

Test ID:	\$30305000
Purpose:	The purpose of this test is to verify that the DUT can correctly request SID \$05 TID \$01.
Rationale:	This test will use a positive response from a single ECU.
Set Up:	The DUT and ECUSIM shall be in the “ISO 9141-2 (2 ECUs) Initialized State”, which is detailed in 5.4.5.6.
Procedure:	
<u>ACTION- DUT</u>	Initiate the request for SID \$05 TID \$01.
<u>EVALUATION</u>	Pass if the 9141_SID\$05_TID\$01 message was transmitted.
<u>ACTION- ECUSIM</u>	After the <i>P2</i> delay, transmit the message 9141_ECU1_SID\$05_MID\$01 .
<u>EVALUATION</u>	Pass if the transmission is successful and the DUT indicates that ECU #1 ECU #1 O2 Bank 1 Sensor 2 has a test limit of 450 mV.

Figure 173 - Verify an ISO 9141-2 SID \$05 TID \$01 request

9.4.13 Verify a SID \$06 MID Supported MID Request (1 ECU)

Test ID:	\$30306000
Purpose:	The purpose of this test is to verify that the DUT can correctly request SID \$06 MID Supported MIDs.
Rationale:	This test will use a positive response from a single ECU.
Set Up:	The DUT and ECUSIM shall be in the “ISO 9141-2 (2 ECUs) Initialized State”, which is detailed in 5.4.5.6.
Procedure:	
<u>ACTION- DUT</u>	Initiate the request for SID \$06 MID \$00 (MID Supported MIDs).
<u>EVALUATION</u>	Pass if the 9141_SID\$06_MID\$00 message was transmitted.
<u>ACTION- ECUSIM</u>	After the <i>P2</i> delay, transmit the message 9141_ECU1_SID\$06_MID\$00 .
<u>EVALUATION</u>	Pass if the transmission is successful and the DUT indicates that ECU #1 supports MIDs \$01, \$02, \$05, and \$06.

Figure 174 - Verify an ISO 9141-2 SID \$06 MID supported MID request

9.4.14 Verify a SID \$07 Pending DTC Request with No DTCs (2 ECUs w/ Order Swap)

Test ID:	\$30307000
Purpose:	The purpose of this test is to verify that the DUT can correctly request SID \$07 and process a 'no DTCs present' response.
Rationale:	This test will use positive responses from two different ECUs. The order of ECU responses will be different than that of the original connection order.
Set Up:	The DUT and ECUSIM shall be in the "ISO 9141-2 (2 ECUs) Initialized State", which is detailed in 5.4.5.6.
Procedure:	
<u>ACTION- DUT</u>	Initiate the request for SID \$07 (Pending DTCs).
<u>EVALUATION</u>	Pass if the 9141_SID\$07 message was transmitted.
<u>ACTION- ECUSIM</u>	After the <i>P2</i> delay, transmit the message 9141_ECU2_SID\$07_NoDTC , delay <i>P2</i> , then transmit the message 9141_ECU1_SID\$07_NoDTC .
<u>EVALUATION</u>	Pass if transmission is successful and the DUT indicates that there are no pending DTCs in either ECU.

Figure 175 - Verify an ISO 9141-2 SID \$07 pending DTC request with no DTCs

9.4.15 Verify a SID \$07 Pending DTC Request with DTCs (2 ECUs)

Test ID:	\$30307001
Purpose:	The purpose of this test is to verify that the DUT can correctly request SID \$07 and process a 'DTCs present' response.
Rationale:	This test will use positive responses from two different ECUs.
Set Up:	The DUT and ECUSIM shall be in the "ISO 9141-2 (2 ECUs) Initialized State", which is detailed in 5.4.5.6.
Procedure:	
<u>ACTION- DUT</u>	Initiate the request for SID \$07 (Pending DTCs).
<u>EVALUATION</u>	Pass if the 9141_SID\$07 message was transmitted.
<u>ACTION- ECUSIM</u>	After the <i>P2</i> delay, transmit the following messages (with a <i>P2</i> delay between each message): 9141_ECU1_SID\$07_DTC_M1 , 9141_ECU1_SID\$07_DTC_M2 , 9141_ECU2_SID\$07_NoDTC .
<u>EVALUATION</u>	Pass if the following is true: The transmission is successful. The DUT indicates that ECU #1 has the following pending DTCs: P0107, P0110, P0115, and P0124. The DUT indicates that ECU #2 has no pending DTCs.

Figure 176 - Verify an ISO 9141-2 SID \$07 pending DTC request with DTCs

9.4.16 Verify a SID \$08 TID Supported TID Request (1 ECU)

Test ID:	\$30308000
Purpose:	The purpose of this test is to verify that the DUT can correctly request SID \$08 TID Supported TIDs.
Rationale:	This test will use a positive response from a single ECU.
Set Up:	The DUT and ECUSIM shall be in the “ISO 9141-2 (2 ECUs) Initialized State”, which is detailed in 5.4.5.6.
Procedure:	
<u>ACTION- DUT</u>	Initiate the request for SID \$08 TID \$00 (TID Supported TIDs).
<u>EVALUATION</u>	Pass if the 9141_SID\$08_PID\$00 message was transmitted.
<u>ACTION- ECUSIM</u>	After the <i>P2</i> delay, transmit the message 9141_ECU1_SID\$08_PID\$00 .
<u>EVALUATION</u>	Pass if the transmission is successful and the DUT indicates that ECU #1 supports TID \$01 (the leak test).

Figure 177 - Verify an ISO 9141-2 SID \$08 TID supported TID request

9.4.17 Verify a SID \$09 INF Supported INF Request (2 ECUs w/ Order Swap)

Test ID:	\$30309000
Purpose:	The purpose of this test is to verify that the DUT can correctly request SID \$09 INF Supported INFs.
Rationale:	This test will use positive responses from two different ECUs. The order of ECU responses will be different than that of the original connection order.
Set Up:	The DUT and ECUSIM shall be in the “ISO 9141-2 (2 ECUs) Initialized State”, which is detailed in 5.4.5.6.
Procedure:	
<u>ACTION- DUT</u>	Initiate the request for SID \$09 INF \$00 (INF Supported INFs).
<u>EVALUATION</u>	Pass if the 9141_SID\$09_PID\$00 message was transmitted.
<u>ACTION- ECUSIM</u>	After the <i>P2</i> delay, transmit the message 9141_ECU2_SID\$09_INF\$00 , delay <i>P2</i> , then transmit the message 9141_ECU1_SID\$09_INF\$00 .
<u>EVALUATION</u>	Pass if the transmission is successful and the DUT indicates that: ECU #1 supports INF \$01 (MC_VIN), INF \$02 (VIN), INF \$03 (MC_CALID), INF \$04 (CALID), INF \$05 (MC_CVN), INF \$06 (CVN), INF \$07 (MC_IPT), INF \$08 (IPT) ECU #2 supports INF \$03 (MC_CALID), INF \$04 (CALID), INF \$05 (MC_CVN), INF \$06 (CVN), INF \$07 (MC_IPT), INF \$08 (IPT)

Figure 178 - Verify an ISO 9141-2 SID \$09 INF supported INF request

9.4.18 Verify a SID \$09 INF Supported INF Request Diesel (2 ECUs w/ Order Swap)

Test ID:	\$30309001
Purpose:	The purpose of this test is to verify that the DUT can correctly request SID \$09 INF Supported INFs.
Rationale:	This test will use positive responses from two different ECUs. The order of ECU responses will be different than that of the original connection order.
Set Up:	The DUT and ECUSIM shall be in the “ISO 9141-2 (2 ECUs) Initialized State”, which is detailed in 5.4.5.6.
Procedure:	
<u>ACTION- DUT</u>	Initiate the request for SID \$09 INF \$00 (INF Supported INFs).
<u>EVALUATION</u>	Pass if the 9141_SID\$09_PID\$00 message was transmitted.
<u>ACTION- ECUSIM</u>	After the <i>P2</i> delay, transmit the message 9141_ECU2_SID\$09_INF\$00_DIESEL , delay <i>P2</i> , then transmit the message 9141_ECU1_SID\$09_INF\$00_DIESEL .
<u>EVALUATION</u>	Pass if the transmission is successful and the DUT indicates that: ECU #1 supports INF \$01 (MC_VIN), INF \$02 (VIN), INF \$03 (MC_CALID), INF \$04 (CALID), INF \$05 (MC_CVN), INF \$06 (CVN), INF \$07 (MC_IPT), INF \$0B (IPT) ECU #2 supports INF \$03 (MC_CALID), INF \$04 (CALID), INF \$05 (MC_CVN), INF \$06 (CVN), INF \$07 (MC_IPT), INF \$0B (IPT)

Figure 179 - Verify an ISO 9141-2 SID \$09 INF supported INF request

9.4.19 Verify a SID \$09 INF Supported INF Request (8 ECUs w/ Order Swap)

Test ID:	\$30309002
Purpose:	The purpose of this test is to verify that the DUT can correctly request SID \$09 INF Supported INFs.
Rationale:	This test will use positive responses from eight different ECUs. The order of ECU responses will be different than that of the original connection order.
Set Up:	The DUT and ECUSIM shall be in the “ISO 9141-2 (2 ECUs) Initialized State”, which is detailed in 5.4.5.6.
Procedure:	
<u>ACTION- DUT</u>	Initiate the request for SID \$09 INF \$00 (INF Supported INFs).
<u>EVALUATION</u>	Pass if the 9141_SID\$09_PID\$00 message was transmitted.
<u>ACTION- ECUSIM</u>	After the <i>P2</i> delay, transmit the following messages (with a <i>P2</i> delay between each message): 9141_ECU2_SID\$09_INF\$00, 9141_ECU1_SID\$09_INF\$00, 9141_ECU4_SID\$09_INF\$00, 9141_ECU3_SID\$09_INF\$00, 9141_ECU6_SID\$09_INF\$00, 9141_ECU5_SID\$09_INF\$00, 9141_ECU8_SID\$09_INF\$00, 9141_ECU7_SID\$09_INF\$00.
<u>EVALUATION</u>	Pass if the transmission is successful and the DUT indicates that: ECU #1 supports INF \$01 (MC_VIN), INF \$02 (VIN), INF \$03 (MC_CALID), INF \$04 (CALID), INF \$05 (MC_CVN), INF \$06 (CVN), INF \$07 (MC_IPT), INF \$08 (IPT)

ECU #2 supports INF \$03 (MC_CALID), INF \$04 (CALID), INF \$05 (MC_CVN), INF \$06 (CVN), INF \$07 (MC_IPT), INF \$08 (IPT)
ECU #3 supports INF \$03 (MC_CALID), INF \$04 (CALID), INF \$05 (MC_CVN), INF \$06 (CVN)
ECU #4 supports INF \$03 (MC_CALID), INF \$04 (CALID), INF \$05 (MC_CVN), INF \$06 (CVN)
ECU #5 supports INF \$03 (MC_CALID), INF \$04 (CALID), INF \$05 (MC_CVN), INF \$06 (CVN)
ECU #6 supports INF \$03 (MC_CALID), INF \$04 (CALID), INF \$05 (MC_CVN), INF \$06 (CVN)
ECU #7 supports INF \$03 (MC_CALID), INF \$04 (CALID), INF \$05 (MC_CVN), INF \$06 (CVN)
ECU #8 supports INF \$03 (MC_CALID), INF \$04 (CALID), INF \$05 (MC_CVN), INF \$06 (CVN)

Figure 180 - Verify an ISO 9141-2 SID \$09 INF supported INF request

9.4.20 Verify a SID \$09 VIN Request (1 ECU)

Test ID:	\$30309003
Purpose:	The purpose of this test is to verify that the DUT can correctly request SID \$09 INF \$02.
Rationale:	This test will use a positive response from a single ECU.
Set Up:	The DUT and ECUSIM shall be in the "ISO 9141-2 (2 ECUs) SID9 Ready State", which is detailed in 5.4.5.8.
Procedure:	
<u>ACTION- DUT</u>	Initiate the request for SID \$09 INF \$02 (VIN).
<u>EVALUATION</u>	Pass if the 9141_SID\$09_INF\$01 or 9141_SID\$09_INF\$02 message was transmitted.
<u>ACTION- ECUSIM</u>	If the DUT transmitted 9141_SID\$09_INF\$01 then after the <i>P2</i> delay, transmit the message 9141_ECU1_SID\$09_INF\$01 and wait for the DUT to transmit 9141_SID\$09_INF\$02. If the DUT transmitted 9141_SID\$09_INF\$02 then after the <i>P2</i> delay, transmit the messages (with a <i>P2</i> delay between each message): 9141_ECU1_SID\$09_INF\$02_M1, 9141_ECU1_SID\$09_INF\$02_M2, 9141_ECU1_SID\$09_INF\$02_M3, 9141_ECU1_SID\$09_INF\$02_M4, 9141_ECU1_SID\$09_INF\$02_M5.
<u>EVALUATION</u>	Pass if the transmission is successful and the DUT indicates that VIN is 1GYDE63A7A0000000.

Figure 181 - Verify an ISO 9141-2 SID \$09 VIN request

9.4.21 Verify a SID \$09 VIN Request with NRC=\$78 (1 ECU)

Test ID:	\$30309004
Purpose:	The purpose of this test is to verify that the DUT can correctly request SID \$09 INF \$02 when the ECU has an initial NRC = \$78.
Rationale:	This test will use a response pending (NRC \$78) from a single ECU.
Set Up:	The DUT and ECUSIM shall be in the "ISO 9141-2 (2 ECUs) SID9 Ready State", which is detailed in 5.4.5.8.
Procedure:	
<u>ACTION- DUT</u>	Initiate the request for SID \$09 INF \$02 (VIN).
<u>EVALUATION</u>	Pass if the 9141_SID\$09_INF\$01 or 9141_SID\$09_INF\$02 message was transmitted.
<u>ACTION- ECUSIM</u>	If the DUT transmits the message 9141_SID\$09_INF\$01 , then after the delay <i>P2</i> , transmit the message 9141_ECU1_SID\$09_INF\$01 . Wait for the remaining message transactions in this ACTION to be completed.
	If the DUT transmits the message 9141_SID\$09_INF\$02 , then after the delay <i>P2_MIN</i> and transmit the message 9141_ECU1_SID\$09_NRC78 .
<u>EVALUATION</u>	Pass if the 9141_ECU1_SID\$09_NRC78 message was transmitted
<u>ACTION- ECUSIM</u>	After the <i>P2</i> delay, transmit the following messages (with a <i>P2</i> delay between each message): 9141_ECU1_SID\$09_INF\$02_M1 , 9141_ECU1_SID\$09_INF\$02_M2 , 9141_ECU1_SID\$09_INF\$02_M3 , 9141_ECU1_SID\$09_INF\$02_M4 , 9141_ECU1_SID\$09_INF\$02_M5 .
<u>EVALUATION</u>	Pass if the transmission is successful and the DUT indicates that VIN is 1GYDE63A7A0000000.

Figure 182 - Verify an ISO 9141-2 SID \$09 VIN request with NRC=\$78

9.4.22 Verify a SID \$09 CALID Request (2 ECUs w/ Order Swap)

Test ID:	\$30309005
Purpose:	The purpose of this test is to verify that the DUT can correctly request SID \$09 INF \$04.
Rationale:	This test will use positive responses from two different ECUs. The order of ECU responses will be different than that of the original connection order.
Set Up:	The DUT and ECUSIM shall be in the “ISO 9141-2 (2 ECUs) SID9 Ready State”, which is detailed in 5.4.5.8.
Procedure:	
<u>ACTION- DUT</u>	Initiate the request for SID \$09 INF \$04 (CALID).
<u>EVALUATION</u>	Pass if the 9141_SID\$09_INF\$03 or 9141_SID\$09_INF\$04 message was transmitted.
<u>ACTION- ECUSIM</u>	If the DUT transmitted 9141_SID\$09_INF\$03 then after the <i>P2</i> delay, transmit the message 9141_ECU1_SID\$09_INF\$03 and wait for the DUT to transmit 9141_SID\$09_INF\$04. If the DUT transmitted 9141_SID\$09_INF\$04 then after the <i>P2</i> delay, transmit the following messages (with a <i>P2</i> delay between each message): 9141_ECU2_SID\$09_INF\$04_M1, 9141_ECU1_SID\$09_INF\$04_M1, 9141_ECU2_SID\$09_INF\$04_M2, 9141_ECU1_SID\$09_INF\$04_M2, 9141_ECU2_SID\$09_INF\$04_M3, 9141_ECU1_SID\$09_INF\$04_M3, 9141_ECU2_SID\$09_INF\$04_M4, 9141_ECU1_SID\$09_INF\$04_M4.
<u>EVALUATION</u>	Pass if the transmission is successful and the DUT indicates that the CALID for ECU #1 is 12589772 while CALID for ECU #2 is 24221419.

Figure 183 - Verify an ISO 9141-2 SID \$09 CALID request

9.4.23 Verify a SID \$09 CALID Request with 9 CALIDs (8 ECUs w/ Order Swap)

Test ID:	\$30309006
Purpose:	The purpose of this test is to verify that the DUT can correctly request SID \$09 INF \$04 when 8 ECUs respond with 9 CALIDs each.
Rationale:	This test will use positive responses from eight different ECUs. The order of ECU responses will be different than that of the original connection order with ECU3 through ECU8 indicating that no SID \$01 PIDs are supported.
Set Up:	The DUT and ECUSIM shall be in the “ISO 9141-2 (8 ECUs) SID9 Ready State”, which is detailed in 5.4.5.10.
Procedure:	
<u>ACTION- DUT</u>	Initiate the request for SID \$09 INF \$04 (CALID).
<u>EVALUATION</u>	Pass if the 9141_SID\$09_INF\$03 or 9141_SID\$09_INF\$04 message was transmitted.
<u>ACTION- ECUSIM</u>	If the DUT transmitted 9141_SID\$09_INF\$03 then after the <i>P2</i> delay, transmit the following messages (with a <i>P2</i> delay between each message): 9141_ECU5_SID\$09_INF\$03, 9141_ECU2_SID\$09_INF\$03, 9141_ECU6_SID\$09_INF\$03, 9141_ECU3_SID\$09_INF\$03, 9141_ECU7_SID\$09_INF\$03, 9141_ECU4_SID\$09_INF\$03,

9141_ECU1_SID\$09_INF\$03, 9141_ECU8_SID\$09_INF\$03 and wait for the DUT to transmit **9141_SID\$09_INF\$04**.

If the DUT transmitted **9141_SID\$09_INF\$04** then after the *P2* delay, transmit the following messages (with a *P2* delay between each message): **9141_ECU5_SID\$09_INF\$04_9_M1** thru **9141_ECU5_SID\$09_INF\$04_9_M35**, **9141_ECU2_SID\$09_INF\$04_9_M1** thru **9141_ECU2_SID\$09_INF\$04_9_M35**, **9141_ECU6_SID\$09_INF\$04_9_M1** thru **9141_ECU6_SID\$09_INF\$04_9_M35**, **9141_ECU3_SID\$09_INF\$04_9_M1** thru **9141_ECU3_SID\$09_INF\$04_9_M35**, **9141_ECU7_SID\$09_INF\$04_9_M1** thru **9141_ECU7_SID\$09_INF\$04_9_M35**, **9141_ECU4_SID\$09_INF\$04_9_M1** thru **9141_ECU4_SID\$09_INF\$04_9_M35**, **9141_ECU1_SID\$09_INF\$04_9_M1** thru **9141_ECU1_SID\$09_INF\$04_9_M35**, **9141_ECU8_SID\$09_INF\$04_9_M1** thru **9141_ECU8_SID\$09_INF\$04_9_M35**.

EVALUATION

Pass if the following is true:

All Transmissions are successful.

The DUT indicates that the CALID for ECU #1 are: "11589778", "21589777", "31589776", "41589775", "51589774", "61589773", "71589772", "81589771", "91589770".

The DUT indicates that the CALID for ECU #2 are: "12589778", "22589777", "32589776", "42589775", "52589774", "62589773", "72589772", "82589771", "92589770".

The DUT indicates that the CALID for ECU #3 are: "13589778", "23589777", "33589776", "43589775", "53589774", "63589773", "73589772", "83589771", "93589770".

The DUT indicates that the CALID for ECU #4 are: "14589778", "24589777", "34589776", "44589775", "54589774", "64589773", "74589772", "84589771", "94589770".

The DUT indicates that the CALID for ECU #5 are: "15589778", "25589777", "35589776", "45589775", "55589774", "65589773", "75589772", "85589771", "95589770".

The DUT indicates that the CALID for ECU #6 are: "16589778", "26589777", "36589776", "46589775", "56589774", "66589773", "76589772", "86589771", "96589770".

The DUT indicates that the CALID for ECU #7 are: "17589778", "27589777", "37589776", "47589775", "57589774", "67589773", "77589772", "87589771", "97589770".

The DUT indicates that the CALID for ECU #8 are: "18589778", "28589777", "38589776", "48589775", "58589774", "68589773", "78589772", "88589771", "98589770".

Figure 184 - Verify an ISO 9141-2 SID \$09 CALID request with 9 CALIDs on an ECU

9.4.24 Verify a SID \$09 CVN Request (2 ECU)

Test ID:	\$30309007
Purpose:	The purpose of this test is to verify that the DUT can correctly request SID \$09 INF \$06.
Rationale:	This test will use positive responses from a two ECUs.
Set Up:	The DUT and ECUSIM shall be in the “ISO 9141-2 (2 ECUs) SID9 Ready State”, which is detailed in 5.4.5.8.
Procedure:	
<u>ACTION- DUT</u>	Initiate the request for SID \$09 INF \$06 (CVN).
<u>EVALUATION</u>	Pass if the 9141_SID\$09_INF\$05 or 9141_SID\$09_INF\$06 message was transmitted.
<u>ACTION- ECUSIM</u>	If the DUT transmitted 9141_SID\$09_INF\$05 then after the <i>P2</i> delay, transmit the following messages (with a <i>P2</i> delay between each message): 9141_ECU1_SID\$09_INF\$05, 9141_ECU2_SID\$09_INF\$05 and wait for the DUT to transmit 9141_SID\$09_INF\$06. If the DUT transmitted 9141_SID\$09_INF\$06 then after the <i>P2</i> delay, transmit the following messages (with a <i>P2</i> delay between each message): 9141_ECU1_SID\$09_INF\$06 and 9141_ECU2_SID\$09_INF\$06.
<u>EVALUATION</u>	Pass if the transmission is successful and the DUT indicates that the CVN for ECU #1 is \$1791BC88 and ECU #2 is \$2791BC88.

Figure 185 - Verify an ISO 9141-2 SID \$09 CVN request

9.4.25 Verify a SID \$09 CVN Request with 9 CVNs (8 ECUs w/ Order Swap)

Test ID:	\$30309008
Purpose:	The purpose of this test is to verify that the DUT can correctly request SID \$09 INF \$06 when 8 ECUs responds with 9 CVNs each.
Rationale:	This test will use positive responses from eight different ECUs. The order of ECU responses will be different than that of the original connection order with ECU3 through ECU8 indicating that no SID \$01 PIDs are supported.
Set Up:	The DUT and ECUSIM shall be in the “ISO 9141-2 (8 ECUs) SID9 Ready State”, which is detailed in 5.4.5.10.
Procedure:	
<u>ACTION- DUT</u>	Initiate the request for SID \$09 INF \$06 (CVN).
<u>EVALUATION</u>	Pass if the 9141_SID\$09_INF\$05 or 9141_SID\$09_INF\$06 message was transmitted.
<u>ACTION- ECUSIM</u>	If the DUT transmitted 9141_SID\$09_INF\$05 then after the <i>P2</i> delay, transmit the following messages (with a <i>P2</i> delay between each message): 9141_ECU5_SID\$09_INF\$05, 9141_ECU2_SID\$09_INF\$05, 9141_ECU6_SID\$09_INF\$05, 9141_ECU3_SID\$09_INF\$05, 9141_ECU7_SID\$09_INF\$05, 9141_ECU4_SID\$09_INF\$05, 9141_ECU1_SID\$09_INF\$05, 9141_ECU8_SID\$09_INF\$05 and wait for the DUT to transmit 9141_SID\$09_INF\$06.

If the DUT transmitted **9141_SID\$09_INF\$06** then after the *P2* delay, transmit the following messages (with a *P2* delay between each message): **9141_ECU8_SID\$09_INF\$06_9_M1** to **9141_ECU8_SID\$09_INF\$06_9_M9**, **9141_ECU1_SID\$09_INF\$06_9_M1** to **9141_ECU1_SID\$09_INF\$06_9_M9**, **9141_ECU7_SID\$09_INF\$06_9_M1** to **9141_ECU7_SID\$09_INF\$06_9_M9**, **9141_ECU2_SID\$09_INF\$06_9_M1** to **9141_ECU2_SID\$09_INF\$06_9_M9**, **9141_ECU6_SID\$09_INF\$06_9_M1** to **9141_ECU6_SID\$09_INF\$06_9_M9**, **9141_ECU3_SID\$09_INF\$06_9_M1** to **9141_ECU3_SID\$09_INF\$06_9_M9**, **9141_ECU5_SID\$09_INF\$06_9_M1** to **9141_ECU5_SID\$09_INF\$06_9_M9**, **9141_ECU4_SID\$09_INF\$06_9_M1** to **9141_ECU4_SID\$09_INF\$06_9_M9**.

EVALUATION

Pass if the following is true:

Transmission is successful.

The DUT indicates that the CVN for ECU #1 is \$1791BC88, \$1891BC87, \$1991BC86, \$1A91BC85, \$1B91BC84, \$1C91BC83, \$1D91BC82, \$1E55AA81, \$1FFF0080.

The DUT indicates that the CVN for ECU #2 is \$2791BC88, \$2891BC87, \$2991BC86, \$2A91BC85, \$2B91BC84, \$2C91BC83, \$2D91BC82, \$2E55AA81, \$2FFF0080.

The DUT indicates that the CVN for ECU #3 is \$3791BC88, \$3891BC87, \$3991BC86, \$3A91BC85, \$3B91BC84, \$3C91BC83, \$3D91BC82, \$3E55AA81, \$3FFF0080.

The DUT indicates that the CVN for ECU #4 is \$4791BC88, \$4891BC87, \$4991BC86, \$4A91BC85, \$4B91BC84, \$4C91BC83, \$4D91BC82, \$4E55AA81, \$4FFF0080.

The DUT indicates that the CVN for ECU #5 is \$5791BC88, \$5891BC87, \$5991BC86, \$5A91BC85, \$5B91BC84, \$5C91BC83, \$5D91BC82, \$5E55AA81, \$5FFF0080.

The DUT indicates that the CVN for ECU #6 is \$6791BC88, \$6891BC87, \$6991BC86, \$6A91BC85, \$6B91BC84, \$6C91BC83, \$6D91BC82, \$6E55AA81, \$6FFF0080.

The DUT indicates that the CVN for ECU #7 is \$7791BC88, \$7891BC87, \$7991BC86, \$7A91BC85, \$7B91BC84, \$7C91BC83, \$7D91BC82, \$7E55AA81, \$7FFF0080.

The DUT indicates that the CVN for ECU #8 is \$8791BC88, \$8891BC87, \$8991BC86, \$8A91BC85, \$8B91BC84, \$8C91BC83, \$8D91BC82, \$8E55AA81, \$8FFF0080.

Figure 186 - Verify an ISO 9141-2 SID \$09 CVN request with 9 CVNs on an ECU

9.4.26 Verify a SID \$09 IPT (INF\$08, 32 bytes) Request (2 ECUs w/ Order Swap)

Test ID:	\$30309009
Purpose:	The purpose of this test is to verify that the DUT can correctly request SID \$09 INF \$08 (32 bytes).
Rationale:	This test will use positive responses from two ECUs. The order of ECU responses will be different than that of the original connection order.
Set Up:	The DUT and ECUSIM shall be in the "ISO 9141-2 (2 ECUs) SID(Ready State", which is detailed in 5.4.5.8.
Procedure:	
<u>ACTION- DUT</u>	Initiate the request for SID \$09 INF \$08 (IPT).
<u>EVALUATION</u>	Pass if the 9141_SID\$09_INF\$07 or 9141_SID\$09_INF\$08 message was transmitted.
<u>ACTION- ECUSIM</u>	If the DUT transmitted 9141_SID\$09_INF\$07 then after the <i>P2</i> delay, transmit the following messages (with a <i>P2</i> delay between each message): 9141_ECU2_SID\$09_INF\$07_832, 9141_ECU1_SID\$09_INF\$07_832 and wait for the DUT to transmit 9141_SID\$09_INF\$08. If the DUT transmitted 9141_SID\$09_INF\$08 then after the <i>P2</i> delay, transmit the following messages (with a <i>P2</i> delay between each message): 9141_ECU2_SID\$09_INF\$08_32_M1

<u>EVALUATION</u>	thru 9141_ECU2_SID\$09_INF\$08_32_M8, 9141_ECU1_SID\$09_INF\$08_32_M1 thru 9141_ECU1_SID\$09_INF\$08_32_M8. Pass if the following is true: Transmission is successful. The DUT indicates that the IPT for ECU #1 is 32 bytes and has the following values: OBDCOND = 100 IGNCNTR = 105 CATCOMP1 = 10 CATCOND1 = 15 CATCOMP2 = 00 CATCOND2 = 00 O2COMP1 = 30 O2COND1 = 35 O2COMP2 = 00 O2COND2 = 00 EGRCOMP = 50 EGRCOND = 55 AIRCOMP = 60 AIRCOND = 65 EVAPCOND = 70 EVAPCOND = 75 The DUT indicates that the IPT for ECU #2 is 32 bytes and has the following values: OBDCOND = 100 IGNCNTR = 105 CATCOMP1 = 00 CATCOND1 = 00 CATCOMP2 = 20 CATCOND2 = 25 O2COMP1 = 00 O2COND1 = 00 O2COMP2 = 40 O2COND2 = 45 EGRCOMP = 00 EGRCOND = 00 AIRCOMP = 00 AIRCOND = 00 EVAPCOND = 00 EVAPCOND = 00
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Figure 187 - Verify an ISO 9141-2 SID \$09 IPT (INF\$08, 32 bytes) request (11-bit, 500K)

9.4.27 Verify a SID \$09 IPT (INF\$08, 40 bytes) Request (2 ECUs w/ Order Swap)

Test ID:	\$3030900A
Purpose:	The purpose of this test is to verify that the DUT can correctly request SID \$09 INF \$08 (40 bytes).
Rationale:	This test will use positive responses from two ECUs. The order of ECU responses will be different than that of the original connection order.
Set Up:	The DUT and ECUSIM shall be in the "ISO 9141-2 (2 ECUs) SID9 Ready State", which is detailed in 5.4.5.8.
Procedure:	
<u>ACTION- DUT</u>	Initiate the request for SID \$09 INF \$08 (IPT).
<u>EVALUATION</u>	Pass if the 9141_SID\$09_INF\$07 or 9141_SID\$09_INF\$08 message was transmitted.
<u>ACTION- ECUSIM</u>	If the DUT transmitted 9141_SID\$09_INF\$07 then after the <i>P2</i> delay, transmit the following messages (with a <i>P2</i> delay between each message): 9141_ECU2_SID\$09_INF\$07_840, 9141_ECU1_SID\$09_INF\$07_840 and wait for the DUT to transmit 9141_SID\$09_INF\$08. If the DUT transmitted 9141_SID\$09_INF\$08 then after the <i>P2</i> delay, transmit the following messages (with a <i>P2</i> delay between each message): 9141_ECU2_SID\$09_INF\$08_40_M1 thru 9141_ECU2_SID\$09_INF\$08_40_M10, 9141_ECU1_SID\$09_INF\$08_40_M1 thru 9141_ECU1_SID\$09_INF\$08_40_M10.
<u>EVALUATION</u>	Pass if the following is true: Transmission is successful. The DUT indicates that the IPT for ECU #1 is 40 bytes and has the following values: OBDCOND = 100 IGNCNTR = 105 CATCOMP1 = 10 CATCOND1 = 15 CATCOMP2 = 00 CATCOND2 = 00 O2COMP1 = 30 O2COND1 = 35 O2COMP2 = 00 O2COND2 = 00 EGRCOMP = 50 EGRCOND = 55 AIRCOMP = 60 AIRCOND = 65 EVAPCOND = 70 EVAPCOND = 75 SO2SCOMP1 = 90 SO2SCOND1 = 95 SO2SCOMP2 = 00 SO2SCOND2 = 00 The DUT indicates that the IPT for ECU #2 is 40 bytes and has the following values: OBDCOND = 100 IGNCNTR = 105 CATCOMP1 = 00 CATCOND1 = 00 CATCOMP2 = 20 CATCOND2 = 25

O2COMP1 = 00
 O2COND1 = 00
 O2COMP2 = 40
 O2COND2 = 45
 EGRCOMP = 00
 EGRCOND = 00
 AIRCOMP = 00
 AIRCOND = 00
 EVAPCOND = 00
 EVAPCOND = 00
 SO2SCOMP1 = 00
 SO2SCOND1 = 00
 SO2SCOMP2 = 90
 SO2SCOND2 = 95

Figure 188 - Verify an ISO 9141-2 SID \$09 IPT (INF\$08, 40 bytes) request

9.4.28 Verify a SID \$09 IPT (INF\$0B, 32 bytes) Request (2 ECUs w/ Order Swap)

Test ID:	\$3030900B
Purpose:	The purpose of this test is to verify that the DUT can correctly request SID \$09 INF \$0B (32 bytes).
Rationale:	This test will use positive responses from two ECUs. The order of ECU responses will be different than that of the original connection order.
Set Up:	The DUT and ECUSIM shall be in the "ISO 9141-2 (2 ECUs) SID9 Diesel Ready State", which is detailed in 5.4.5.9.
Procedure:	
<u>ACTION- DUT</u>	Initiate the request for SID \$09 INF \$0B (IPT).
<u>EVALUATION</u>	Pass if the 9141_SID\$09_INF\$07 or 9141_SID\$09_INF\$0B message was transmitted.
<u>ACTION- ECUSIM</u>	If the DUT transmitted 9141_SID\$09_INF\$07 then after the <i>P2</i> delay, transmit the following messages (with a <i>P2</i> delay between each message): 9141_ECU2_SID\$09_INF\$07_B32, 9141_ECU1_SID\$09_INF\$07_B32 and wait for the DUT to transmit 9141_SID\$09_INF\$08. If the DUT transmitted 9141_SID\$09_INF\$0B then After the <i>P2</i> delay, transmit the following messages (with a <i>P2</i> delay between each message): 9141_ECU2_SID\$09_INF\$0B_32_M1 thru 9141_ECU2_SID\$09_INF\$0B_32_M8, 9141_ECU1_SID\$09_INF\$0B_32_M1 thru 9141_ECU1_SID\$09_INF\$0B_32_M8.
<u>EVALUATION</u>	Pass if the following is true: Transmission is successful. The DUT indicates that the IPT for ECU #1 is 32 bytes and has the following values: OBDCOND = 100 IGNCNTR = 105 HCCATCOMP1 = 10 HCCATCOND1 = 15 NCATCOMP2 = 00 NCATCOND2 = 00 NADSCOMP1 = 00 NADSCOND1 = 00 PMCOMP2 = 00 PMCOND2 = 00 EGSCOMP = 50