BUREAU OF AUTOMOTIVE REPAIR
INITIAL STATEMENT OF REASONS

HEARING DATE: No hearing has been scheduled.

SUBJECT MATTER OF THE PROPOSED REGULATIONS: Updated Smog Check Inspection Equipment and Station Requirements

SECTIONS AFFECTED: Amend California Code of Regulations Title 16, Division 33, Chapter 1, Article 5.5, Section 3340.17, subdivision (b).

REGULATORY PROPOSAL OVERVIEW:

The Department of Consumer Affairs, Bureau of Automotive Repair (BAR) is the state agency charged with administration and implementation of the Smog Check Program as well as the Vehicle Safety Systems Inspection Program. The Smog Check Program is designed to reduce air pollution from mobile source passenger vehicles by requiring that these vehicles meet specific Smog Check inspection standards. The Vehicle Safety Systems Inspection Program is designed to verify that safety systems on vehicles are operating as designed.

For Smog Check Program inspections, inspectors are required to use one of two different vehicle inspection systems depending on the inspected vehicle's age, weight, and fuel type. The BAR-97 Emissions Inspection System (EIS) is primarily used to measure tailpipe emissions on model year 1999 and older vehicles. The On-Board Diagnostic Inspection System (OIS) is primarily used to collect electronic emissions control system data from model year 2000 and newer vehicles. For Vehicle Safety Systems Inspection Program inspections, inspectors also use the OIS by running Cal- VIS software supporting both Smog Check and Vehicle Safety Systems inspection functionality.

The EIS and the OIS include hardware and software built by private vendors to BAR specifications. Vehicle Inspection system models that pass BAR certification testing are BAR certified for use by Smog Check stations. For the OIS, the hardware is currently certified to the BAR OBD Data Acquisition Device Specification dated October 22, 2012. There are three private vendors producing DADs that meet the current DAD specification and over 7,000 DADs being used in the Smog Check Program.

The primary focus of the proposed regulatory language is to update the current BAR OBD Data Acquisition Device (DAD) Specification with a more comprehensive version. This change is necessary to provide BAR with additional tools to combat fraud in the Smog Check Program. In addition, this change will allow the DAD to communicate with newer vehicles that use a communication protocol not supported by the current generation of DADs.

Because the OIS is small and portable, BAR has experienced situations where BAR personnel have visited a Smog Check station that is currently conducting a Smog Check inspection, only to find the Smog Check station closed and no one present. It is illegal for the Smog Check station to

conduct a Smog Check inspection anywhere other than within the walls of the station. The updated DAD specification provides BAR with location data to pinpoint where physically the Smog Check inspection is occurring.

Given the location data, the BAR personnel can visit the location of the actual Smog Check inspection.

Smog Check stations conducting fraudulent vehicle inspections will often utilize an electronic device or data source, also known as an OBDII simulator, as a substitute for the actual emissions control system data from the vehicle's computer that would otherwise cause the vehicle to fail a vehicle inspection. There is no legitimate business need to possess an OBDII simulator in a Smog Check station. The updated DAD specification provides BAR with additional means of communication with the vehicle's computer that will allow BAR to determine when the OIS is communicating with an OBDII simulator instead of the vehicle's computer.

As fraud has been evolving since the inception of the OIS, the OBDII simulators that BAR is encountering have become more and more sophisticated. BAR envisions a point where the OBD II simulators will become indistinguishable from the vehicle's computer by communication alone. The updated DAD specification provides the ability to capture and analyze the actual electronic signals coming from the vehicle's computer and to pinpoint when an OBDII simulator is being employed instead of the vehicle's actual computer.

Beginning with some newer vehicles, a new communication protocol is being phased in. The current generation of DADs do not support this new protocol and will not be able to interrogate the computer systems on these newer vehicles. Retrieval of the vehicle's On-Board Diagnostic data is a required part of a Smog Check inspection. The updated DAD specification provides the ability to fully communicate with this new protocol.

The proposed regulation incorporates by reference revised Smog Check inspection equipment standards as necessary to enhance data collection for improved fraud detection and to ensure communication compatibility with future model year vehicles.

California Health and Safety Code (HSC) requires all Smog Check stations utilize equipment certified by the Department of Consumer Affairs (HSC 44036(b)(1)), permits BAR to adopt and revise standards for certification (HSC 44036(b)(3)), and specifically includes hardware specifications (HSC 44036(f)(2)).

Various manufacturers interesting in selling Smog Check inspection equipment in California must first submit equipment to BAR for certification testing. If the equipment passes testing in both BAR's laboratory environment and real-world beta stations, BAR will issue the manufacturer a BAR certification for its use. Subsequently, manufacturers whose equipment fails to meet BAR specifications during initial or continuing certification or who fail to install updates in a timely manner are subject to decertification and citation.

The updated DAD specification prescribes several requirements which equipment manufacturers must meet when submitting equipment for BAR certification. Besides performance standards, the DAD specification includes requirements for manufacturers to share in confidence with BAR information about their equipment design as necessary to ensure proper BAR certification testing.

Proposed Change Highlights
The following discussion summarizes the proposed changes to regulatory text and to BAR certified vehicle inspection equipment specifications that are incorporated by reference within the regulation.

In Section 3340.17 Test Equipment, Electronic Transmission, Maintenance and Calibration Requirements, the proposal updates the current DAD specification with a more comprehensive version. The proposed change is necessary to provide BAR with additional tools to combat fraud in the Smog Check Program. The below sections of this Initial Statement of Reasons describe in detail the updates made to the DAD specification.

PROPOSED REGULATORY CHANGES:

California Code of Regulations, title 16, section 3340.17 will be revised as follows:

(b) The OBD data acquisition device shall meet the specifications as follows ~~contained in the BAR OBD Inspection System Data Acquisition Device Specification dated, October 22, 2012~~, which ~~is~~ are hereby incorporated by reference.

(1) The BAR OBD Inspection System Data Acquisition Device Specification dated October 22, 2012 shall be in effect until subparagraph (2) is implemented.

(2) The California Vehicle Inspection System Data Acquisition Device Specification dated October 2023 shall become effective on [OAL to insert effective date].

Problem
BAR enforces regulations addressing Smog Check procedures. Given the high cost of repair when emission controls are found faulty, there is great demand for Smog Check inspections that falsely pass a vehicle. The DADs built to the current DAD specification are insufficient to adequately curb this fraud. BAR needs to enhance the fraud detection capabilities of the DAD to detect and prevent the ever evolving, more and more sophisticated fraud. As mentioned above, a new communication protocol is being phased in for some 2024 model year vehicles, which needs to be addressed. The updated DAD specification provides the ability to fully communicate with 2024 and newer vehicles.

Purpose
The proposed regulatory language updates the current DAD specification with a more comprehensive version. This change is necessary to provide BAR with additional tools to combat fraud in the Smog Check Program as well as to communicate with the newer vehicles.

Necessity
DADs built to the updated DAD specification will provide BAR with additional fraud detection and prevention methods that will provide BAR with additional tools to combat fraud in the Smog Check Program as well as to communicate with the newer vehicles.

Benefits
Additional fraud detection and prevention methods fed by data collected by the DADs built to the updated DAD specification will support BAR personnel in rooting out Smog Check stations that conduct fraudulent vehicle inspections. This will reduce the number of improperly certified

vehicles, thus improving air quality and protecting consumers who may have otherwise purchased these illegally certified vehicles. Smog Check inspectors who perform legitimate vehicle inspections will benefit because fraudulent actors will be more likely to turn customers seeking an illegitimate vehicle inspection away.

Prescriptive v. Performance Standard
BAR has chosen to implement a performance standard in the implementation of the updated DAD specification for three primary reasons. First, this is how the original implementation of the DAD specification was done, and the implementation proved to be very successful. Second, by implementing a performance standard, multiple DAD Vendors are likely to build DADs which will mitigate problems should supply chain breakdowns affect one or more of the DAD Vendors. The remaining DAD Vendors will be able to continue to provide DADs for the Smog Check program to continue uninterrupted. Third, having multiple DAD Vendors promotes price competition in the Smog Check equipment supply marketplace and will provide Smog Check stations to acquire the best value for their investment.

Changes Made to the BAR OBD Inspection System Data Acquisition Device Specification

I. Changes made throughout the document

1. The words “The BAR” have been replaced with the word “BAR”. This change was necessary to align the document more closely with the Department of Consumer Affair’s Style Guide, Revised August 2019.

2. Where needed, a comma was added before the word “and” to separate three or more items in a series. This change was necessary to align the document more closely with the Department of Consumer Affair’s Style Guide, Revised August 2019.

3. The words “BAR’s Next Generation Electronic Transmission (NGET) Web Application (NWA).” or “NWA” were replaced with the words “Cal-VIS software”. This change was necessary because at the writing of the original DAD specification, the name of the software had not been finalized. Since that time, the Cal-VIS software has been created and deployed.

4. The word “bureau” has been replaced with the word “BAR”. The words are synonymous, and the use of a single word is less confusing.

5. The words “BAR Certified” were removed from the phase “BAR Certified DAD Vendor”. This change was necessary because BAR only certifies the DAD itself, not the Vendor providing the DAD. The words were causing confusion and removing them creates clarity and consistency for the reader.

6. The document header was removed. This change was necessary to meet document accessibility standards pursuant to Assembly Bill 434 (Baker, Chapter 780, Statutes of 2017). In addition, the included text was already conveyed to the reader in the footer of the document. Removing the header makes the document less cluttered for the reader.

7. The words “BAR OIS” and “BAR-OIS” have been replaced with “OIS”. This change was necessary as OIS is the name that has been used in other BAR regulations. This alignment of naming convention clarifies the equipment’s name to the reader and removes possible confusion.

8. In the original DAD specification, there are 12 instances where the phrase “Requirement Deleted” is found. This was due to requirements being removed late into the writing process and BAR choosing not to renumber all the other requirements to accommodate the removed requirements. In the updated DAD specification, these phrases have been removed.

9. The word “DAD” has been placed in front of the word “specification” where appropriate. There are many different specifications referred to though out the document. This was done to clarify which specification is being referred to. This prevents any confusion the read might otherwise have.

10. The document footer was updated to the new document name and date. This change was necessary because the name and date of the document changed.

II. Changes to the Name, Version, and Revision Date of the Document

1. On the cover page, the “Department of Consumer Affairs” graphic was removed. This change was necessary to meet document accessibility standards pursuant to Assembly Bill 434 (Baker, Chapter 780, Statutes of 2017).

2. On the cover page, the “Bureau of Automotive Repair” graphic was changed from color to black and white. This change was necessary to meet document accessibility standards pursuant to Assembly Bill 434 (Baker, Chapter 780, Statutes of 2017).

3. On the cover page, the acronym “BAR” was replaced with “Bureau of Automotive Repair”. This change was necessary to align the document more closely with the Department of Consumer Affairs Style Guide, Revised August 2019.

4. On the cover page, the initialism “OBD” was replaced with “California Vehicle”. This change was necessary since the DADs built to the updated DAD specification will be used in both BAR’s Smog Check Program and BAR’s Vehicle Safety Systems Inspection Program. This change has prompted BAR to use the more inclusive title “California Vehicle Inspection System” as the document name. The change was made to reflect the broader use of the DAD in BAR’s vehicle inspection programs.

5. On the cover page, the words “Version 2.5” have been removed. This change was necessary as the document is incorporated by reference to regulation by the revision date, not the version number.

6. On the cover page, the revision date “October 22, 2012” was updated to reflect the current version “October 2023”. This change was necessary for the document to be referenced by the correct revision date.

III. INTRODUCTION

The Introduction section was modified to align the document more closely with the Department of Consumer Affairs Style Guide, Revised August 2019.

1. The words “The objective of this document is to lay the foundation for” have been replaced with the words “This document is”. This change was necessary as the document is in the final form.

2. The words “Bureau of Automotive Repair (BAR) California Vehicle Inspection System (Cal-VIS)” replaced the phrase “OBD Inspection System (OIS). This change was necessary to define these two acronyms upon their first use and to align the document more closely with the Department of Consumer Affairs Style Guide, Revised August 2019. In addition, Cal-VIS replaced OIS because a more global name was needed after safety inspection functionality was added to the existing Smog Check inspection functionality.

3. The word “Inspection” was removed from the phase “California’s Smog Check Inspection Program” since it is not included in the actual name of the Program. The removal prevents confusion and increased clarity for the reader.

4. The words “and Vehicle Safety Systems Inspection Program” have been added. This change is necessary to accurately describe that the DAD specification applies to both the Smog Check Program and the Vehicle Safety Systems Inspection Program. The required use of the DAD in Vehicle Safety Systems Inspection Program stations is noted in the proposed Vehicle Safety Systems Inspection Program regulations which creates section 311.1.2 in Article 3, Chapter 1, Division 33, Title 16 of the California Code of Regulations. This proposed section establishes Vehicle Safety Systems Inspection Program station standards and equipment requirements.

IV. Section 1.1: Purpose

1. The initialism “OBD” has been placed in parentheses and the words “On Board Diagnostic” have been added. This change was necessary as this is the first occurrence of the initialism and to align the document more closely with the Department of Consumer Affairs Style Guide, Revised August 2019.

2. The uppercase “C” in the word community was replaced with the lowercase “c” as it was improperly capitalized.

3. The phase “and Vehicle Safety Systems Inspection” have been added. As explained above, the DAD is required to be used in BAR’s Smog Check Program and Vehicle Safety Systems Inspection Program.

4. The word “Program” was made plural, as the DAD is required in both programs.

5. The initialism “OBDII” has been placed in parentheses and the words “OBD second generation” have been added. This change was necessary as this is the first occurrence of the initialism and to align the document more closely with the Department of Consumer Affairs Style Guide, Revised August 2019.

6. The words “and the Business and Professions Code Section 9888.5(a)” have been added. This addition is necessary because this is the regulation that pertains to uniformity in the Vehicle Safety Systems Inspection Program.

V. Section 1.2: Scope

The Scope section was modified to reflect the current state of technology and business environment.

1. The initialism “OIS” has been placed in parentheses and the words “OBD Inspection System” have been added. This change was necessary as this is the first occurrence of the initialism and to align the document more closely with the Department of Consumer Affairs Style Guide, Revised August 2019.

2. The phrase “will consist” has been replaced with “consists”. This change from future to present tense was necessary because at the writing of the original DAD specification, the OIS was only in a conceptual stage. Since that time, the OIS has been developed and implemented.

3. The words “biometric device, camera” were added to the definition of an OIS. This change was necessary to reflect the updated definition of an OIS.

4. The sentence “These separate components may be assembled by vehicle inspection stations, may be provided as a unit by various vendors, or could be an all-in-one solution such as an integrated tablet.” was added. This change was necessary to communicate how the OIS can be purchased based on current availability of similar equipment used in the automotive repair industry. The mentioned variety includes existing and new planned configurations to be offered by DAD Vendors. This provides options within the prescriptive standard.

5. The sentence “The BAR OIS shall run “Windows 7, 32 bit” with a minimum of Service Pack 1 (SP1) as an operating system, and use a minimum of Internet Explorer version 9 as the Web Browser or an operating system and browser approved by the BAR.” was modified to “The OIS shall run a BAR tested and approved version of Microsoft Windows operating system software. The operating system software version shall be supported by Microsoft. When no longer supported, the operating system software shall be updated to a supported version.” This change was necessary to ensure that BAR has the authority to control the versions of computer operating systems that are allowed to run the Cal-VIS software. The Cal-VIS software is continuously updated to work on current software so stations owning the equipment will be required to update their operating system software as necessary to maintain operability. Computer operating systems must be updated to remain in compliance with the State Administrative Manual (SAM), Information Technology - Office of Information Security, Chapter 5300, Provisions for Agreements with State and Non-State Entities, Section

5305.8, Policy 5, "Agreements to apply security patches and upgrades, and keep virus software up-to-date on all systems on which data may be used". In addition, the sentence "Windows 7, 32bit" with a minimum of Service Pack 1 (SP) as an operating system, and use a minimum of Internet Explorer version 9 as the Web Browser or an operating system and browser approved by the BAR." was removed because Microsoft is no longer providing 32-bit operating system software for new computers. In addition, Internet Explorer is no longer available from Microsoft. The requirement to use a Microsoft product exists in the current regulatory text but is updated with current product information.

6. The phrase "will access" is being replaced with the word "accesses". This change from future to present tense was necessary because at the writing of the original DAD specification, the OIS was only in a conceptual stage. Since that time, the OIS has been developed and implemented.

7. The words "Next Generation Electronic Transmission Web Application (NWA)" were replaced with the words "Cal-VIS software". This change was necessary because at the writing of the original DAD specification, the name of the software had not been finalized. Since that time, the Cal-VIS software has been developed and implemented.

8. The phrase "or Vehicle Safety Systems" has been added to indicate that the DAD is used in both the Smog Check Program and the Vehicle Safety Systems Program.

9. The uppercase "I" in the word inspections was replaced with the lowercase "i" as it was improperly capitalized.

10. The words "will reside" were replaced with the word "resides". This change from future to present tense was necessary because at the writing of the original DAD specification, the OIS was only in a conceptual stage. Since that time, the OIS has been developed and implemented.

11. The phrase "and Vehicle Safety Systems Inspection Program" has been added in front of the word "stations" to indicated that the DAD is used in both station types.

12. The uppercase "S" in the word state was replaced with the lowercase "s" as it was improperly capitalized,

13. The word "schools" was added to the places that use the OIS. This change was necessary because at the writing of the original DAD specification, schools were unintentionally omitted from the list. When teaching persons interested in seeking or renewing a Smog Check inspector or repair license, CCR 3340.32 requires schools use a vehicle inspection system described in CCR 3340.17.

14. The phrase "BAR OIS" was replaced with "Smog Check vehicle inspection functionality within the Cal-VIS software". This change is made to further strengthen the understanding that there are two programs using the OIS and the DAD, Smog Check and Vehicle Safety Systems.

15. The words "will be" were replaced with the word "is". This change from future to

present tense was necessary because at the writing of the original DAD specification, the OIS was only in a conceptual stage. Since that time, the OIS has been developed and implemented.

16. The word “vehicle” was added before the work “inspection”. This was done to add consistency with how the word “inspection” is presented in the rest of the DAD specification.

17. The uppercase “I” in the word inspections was replaced with the lowercase “i” as it was improperly capitalized.

18. The sentence “The Vehicle Safety Systems inspection functionality within the Cal-VIS software is used by licensed technicians performing Vehicle Safety Systems Inspections and other station personnel.” has been added. This change has been made to further strengthen the understanding that there are two programs using the OIS and the DAD, Smog Check and Vehicle Safety Systems.

19. The sentence “The primary function of the BAR OIS is to perform Smog Check Inspections” has been deleted. This change was necessary as the sentence is redundant to the information in the proceeding section and removing the sentence improves the clarity of the document.

VI. Section 1.3: Definitions, Acronyms, and Abbreviations

The title of the document was updated from “BAR OBD Inspection System Data Acquisition Device Specification” to “BAR California Vehicle Inspection System Dad Acquisition Device Specification”. This was done because the DAD is used in both of California’s vehicle inspection programs. This change clarifies the name of the document.

VII. Section 1.4: External Documents and Specifications

Section 1.4 was added since the external documents and specifications relied upon were scattered throughout the DAD specification. Listing these documents and their source in this section makes the DAD specification more concise, easier to understand, and improves flow and readability. This will help further efficiency of regulations, improve understanding, and eliminate unnecessary questions from licensees, consumers, and staff.

The DAD specification relies on external documents and specifications because these documents explain in granular detail the areas to which they pertain. These specific documents create a level of understanding and a reference point to work from. This eliminates the need for BAR to explain each of these areas. This method was chosen since it is normal industry practice to refer to existing standards. In some cases, BAR is referencing external documents and specifications that were not included in the original DAD specification or are more recently dated versions of external documents and specifications than were included in the original DAD specification. When this is done, it is because these are areas where BAR

has included enhancements to the DAD specification. In some cases, the titles of the external documents and specifications have been modified to standardize the format. This standardization improves the readability of the documents title and removes possible confusion for existing and potential DAD Vendors.

“This DAD specification relies on external documents and specifications. The following is a list of these external documents and specifications and where they may be obtained. These external documents and specifications are incorporated by reference.”

Referenced External Document or Specification	Source
National Marine Electronics Association (NMEA) 0183 Standard for Interfacing Marine Electronic Devices Version 4.10 standard, dated June 2012	Available for purchase from the National Marine Electronics Association
National Geospatial-Intelligence Agency (NGA) Standardization Document, Department of Defense World Geodetic System 1984, dated 2014-07-08	Available from BAR
IEC 61000-4-2 - International Electrotechnical Commission (IEC) immunity standard on Electrostatic Discharge (ESD), dated 2008-12-09	Available for purchase from the International Electrotechnical Commission
SAE J1978 200204, “OBD II Scan Tool - Equivalent to ISO/DIS 15031- 4: December 14, 2001”, revised 2002-04	Available for purchase from the Society of Automotive Engineers International
SAE J1962 201607, "Diagnostic Connector - Equivalent to ISO/DIS 15031-3: December 14, 2001", revised 2016-07	Available for purchase from the Society of Automotive Engineers International
SAE J1979 201702, “E/E Diagnostic Test Modes”, revised 2017-02	Available for purchase from the Society of Automotive Engineers International
SAE J1979-2 202104, “E/E Diagnostic Test Modes: OBDonUDS”, issued 2021-04	Available for purchase from the Society of Automotive Engineers International

Referenced External Document or Specification	Source
SAE J1979-DA 202104, “Digital Annex of E/E Diagnostic Test Modes”, issued 2021-04	Available for purchase from the Society of Automotive Engineers International
SAE J2534-1 201510, “Recommended Practice for Pass- Thru Vehicle Programming”, revised 2015-10	Available for purchase from the Society of Automotive Engineers International
ISO 14229-1:2020 “Road vehicles - Unified diagnostic services (UDS)”, dated 2020-02	Available for purchase from the International Organization for Standardization
FCC Part 15 Class A, dated 04-03- 2023	See Code of Federal Regulations https://www.ecfr.gov/current/title- 47/chapter-I/subchapter-A/part-15
ISO 9141-2:1994 amended 1:1996, dated 1996-12	Available for purchase from the International Organization for Standardization
“Volkswagen Group of America K- Line Communication Description”, Version 3.0, dated 11/20/09	Available from BAR
SAE J1850, 200606, Class B Data Communication Network Interface, Reaffirmed 2006-06	Available for purchase from the Society of Automotive Engineers International
ISO 14230-4: Road vehicles – Diagnostic systems - 2000 Keyword protocol 2000 - Part 4: Requirements for emission-related systems, dated 2000-06-01	Available for purchase from the International Organization for Standardization
“Keyword Protocol 2000 Data Link Layer Recommended Practice”, Version 1.5, dated October 1, 1997	Available from BAR
ISO 15765-4: Road vehicles – Diagnostic communication over Controller Area Network	Available for purchase from the International

Referenced External Document or Specification	Source
(DoCAN) – Part 4: Requirements for emissions-related systems, dated 2021-07	Organization for Standardization
A summary of the most common mistakes when implementing the OBD on CAN (ISO15765-4) initialization sequence"	Available from BAR
ISO 2768-1: General tolerances - Part 1: Tolerances for linear and angular dimensions without individual tolerance indications, dated 1989-11-15	Available for purchase from the International Organization for Standardization
DAD Communication Specification	Available to DAD Vendors after signing the non-disclosure agreement. Otherwise, not available per Government Code 11340.9(e)
DAD Encryption Specification	Available to DAD Vendors after signing the non-disclosure agreement. Otherwise, not available per Government Code 11340.9(e)
ISO 27145-4:2016, dated 2016-04-01	Available for purchase from the International Organization for Standardization

VIII. Section 2: DATA ACQUISITION DEVICE OVERVIEW

Section 2 was modified since the existing language is difficult to understand and superfluous. As such, it is necessary to amend to make it more concise, easier to understand, and to improve flow and readability. This will help further efficiency of regulations, improve understanding, and eliminate unnecessary questions from licensees, consumers, and staff.

1. The words "ON BOARD DIAGNOSTIC (OBD)" and "(DAD)" were removed from the section title. This change was necessary to align the document more closely with the Department of Consumer Affairs Style Guide, Revised August 2019.

2. The words "On Board Diagnostic (OBD) Data Acquisition Device (DAD)" have been replaced with the word "DAD". This change was necessary since the initialism OBD, and the acronym DAD had already been defined in Section 1: INTRODUCTION of the DAD specification.

3. The words “BAR OBD Inspection System (OIS)” have been replaced with the initialism “OIS”. This change was necessary to because the initialism OIS has already been introduced in Section 1: INTRODUCTION of the DAD specification.

4. The words “The BAR OIS shall run “Windows 7, 32 bit” with a minimum of Service Pack 1 (SP1) as an operating system, and use a minimum of Internet Explorer version 9 as the Web Browser or an operating system and browser approved by the BAR.” were removed. This change was necessary as this information was redundant with the same information found in Section 1.2: Scope.

5. The words “will connect” was replaced with the word “connects”. This change from future to present tense was necessary because at the writing of the original DAD specification, the OIS was only in a conceptual stage. Since that time, the OIS has been developed and implemented.

6. The phrase “Smog Check Inspection” has been replaced with the phrase “vehicle inspections”. This was done because the Cal-VIS software controls both BAR’s Smog Check inspection and Vehicle Safety Systems inspection.

7. The word “must” was replaced with the word “shall”. There is no discernable difference between how “shall” and “must” are interpreted by BAR. This change was necessary to standardize the language used in BAR regulations.

8. The word “computer” was added. This change was necessary to clarify that it is the computer that has the standard connections and interfaces.

9. The phrase “will have” was replaced with the word “has”. This change from future to present tense was necessary because at the writing of the original DAD specification, the OIS was only in a conceptual stage. Since that time, the OIS has been developed and implemented.

10. The sentence “The DAD is comprised of the hardware, firmware and software drivers necessary to meet the requirements of this specification.” were removed. This change was necessary as this information was redundant with the same information found in the next paragraph.

11. The word “and” was replaced with a comma (,). This change was necessary as the sentence was grammatically improper.

12. In the next paragraph, the word “computer,” was removed. This change was necessary as the DAD specification includes requirements on the computer.

13. The words “biometric device, camera,” were added. This change was necessary to update the definition of an OIS as including a biometric device and camera per the Smog Check Equipment Security and Fraud Prevention regulation package, effective October 1, 2023.

14. The word “the” was replaced with the word “all”. This change was necessary to clarify that all items are included in the definition of the DAD. BAR has had issues with DAD Vendors updating items and not reporting the update to BAR. This resulted in untested items being deployed by the DAD Vendors that had the potential to compromise the Smog Check Program.

15. The word “drivers” was replaced with the words “(including drivers)”. This change was necessary because BAR had not anticipated that the DAD Vendors would not only be installing software drivers on the OIS computers, but also additional software. The replacement of the words clarifies that both software and software drivers are included in the definition of the DAD.

IX. Section 3: REQUIREMENTS

This Requirements section includes the necessary detailed requirements which the DAD must meet to obtain BAR certification.

Section 3.1: General Requirements

Changes were made to the numbering of the subsections throughout this section to accommodate the addition of new subsections as described below.

Section 3.1.1: A new requirement has been added: “The DAD Vendor shall only release the current production version of the Cal-VIS software to stations.” was added because there are non-production versions of the Cal-VIS software that incorporate additional tools that are not appropriate for the stations to possess. This conveys to the DAD Vendors that they shall not share the non-production versions. The change is being made this way because the Cal-VIS software includes multiple versions for testing purposes prior to release to production users. DAD Vendors are given and expected to use a non-production version for testing their products on the latest code before stations. If a station uses a non-production version, the vehicle will not receive a certificate of compliance as needed to satisfy the California Department of Motor Vehicles (DMV) registration renewal requirement.

Section 3.1.3: The new requirement “The DAD shall not cause malfunctions to any vehicle’s systems or operation.” was added because it is possible for the DAD to place a vehicle into a non-working state. The change is being made this way because the DAD sends commands to a vehicle’s computer that if inappropriate could affect the vehicle’s operability causing need for repair. The DAD Vendors are responsible to include in their devices logic that will ensure proper vehicle communication.

Section 3.1.4: The letter “(s)” was added to the word “system”. This change conveys to the stakeholders that the DAD must operate with more than one computer operating system. The computer operating system on the OIS computer can change on a frequent basis to remain in compliance with the computer operating system requirements in Section 1.2: Scope as well as the State Administrative Manual, as cited above.

Section 3.1.5: The words “Web Browser” had the capitalization removed because it is not customary to capitalize these words. The letter “(s)” was added to the word “browser”. This change conveys to the stakeholders that the DAD must operate with more than one web browser. The web browser on the OIS computer can change on a frequent basis to remain in compliance with the web browser requirements in Section 1.2: Scope

Section 3.1.6: The new requirement “All DAD Vendor software necessary to complete a vehicle inspection shall be located in a folder named by the DAD Vendor within the c:\Program Files or c:\Program Files (x86) folder.” was added because under the original DAD specification, it was possible for DAD Vendors to fix problems without BAR’s knowledge. This requirement ensures that all fixes that have been implemented will be stored in a known location. The change is being made this way because there was no standardized location for DAD Vendor’s files which caused great difficulty in tracking each file for several BAR certified DAD Vendors’ products.

Section 3.1.8: The words “cause burning of” were replaced with “burn”. This change was necessary to align the document more closely with the Department of Consumer Affairs Style Guide, Revised August 2019.

Section 3.1.9: The word “the” was replaced with the word “all” and the words “operate the DAD and” were added because for the DAD to complete a vehicle inspection, a variety of files/drivers/and hardware are necessary. The original DAD specification language did not completely encompass all the necessary components needed to utilize the DAD and complete a vehicle inspection. This resulted in issues during BAR’s certification process and in-field operations where only a portion of the required files were presented to BAR. When BAR would perform testing, the tests could not be successfully completed because of missing files. This caused delays in certification. For this reason, the additional language was inserted to ensure DAD Vendors supply all the necessary hardware, firmware, and software drivers that are needed to communicate with their device and BAR’s system during the certification process.

Section 3.1.9.1: The new requirement “When the Cal-VIS software queries the DAD for connection type, the DAD shall identify the means in which the DAD is currently communicating with the OIS computer. (e.g. The DAD is connected by USB cable, Ethernet cable, Bluetooth or Wi-Fi).” was added because when communication issues arise between the OIS computer and the DAD, it will be necessary to know the connection type for trouble-shooting the issue. The change is being made this way because the DAD already communicates other status data like a self-test result that aids BAR in supporting end users.

The original 3.1.7 requirement was “The BAR Certified DAD Vendor shall at a minimum supply the DAD in a hardwired configuration.” This requirement has been removed because BAR has found that wireless DADs work well within the system and the additional cost to the DAD Vendor of requiring multiple connection modes was unwarranted. Stations also prefer the wireless feature.

Section 3.1.10: The words “this specification” were replaced with the words “the DAD specification version to which the DAD was certified” because there will be two versions of DAD specification, the original version, dated 2012, and this proposed updated version. It would be illogical to require that the DAD conform to a version of the DAD specification to which it was not certified.

Section 3.1.10.1: The uppercase “S” in the words state and stations were replaced with the lowercase “s” as they were improperly capitalized.

Section 3.1.10.2: The uppercase “S” in the words state and stations were replaced with the lowercase “s” as they were improperly capitalized.

Section 3.1.10.5: The phrase “or the Vehicle Safety Systems Inspection Program” has been added. This change is necessary to accurately describe that the requirement applies to both the Smog Check program and the Vehicle Safety Systems Inspection Program.

Section 3.1.10.5.1: The new requirement “In the event that a software security scan of the DAD results in High and/or Very High findings, the DAD Vendor shall remediate these problems with an emergency update.” was added because since the release of the original DAD specification, software security scans have become an industry best practice. Nefarious individuals could exploit security vulnerabilities which would jeopardize the integrity of the vehicle inspection. Vulnerabilities in the High and/or Very High range are serious enough that they must be immediately addressed. In addition, this requirement is being added since in BAR’s experience, DAD Vendors are reluctant to make changes to the DAD unless there is a specific requirement that requires them to make a change. The change is being made this way because having a specific requirement that addresses this situation ensures that an identified security risk will be mitigated.

Section 3.1.10.5.2: The new requirement “In the event that a software security scan of the DAD results in lower priority findings, the DAD Vendor shall remediate these problems at the next quarterly update.” was added because since the release of the original DAD specification, software security scans have become an industry best practice. Nefarious individuals could exploit security vulnerabilities which would jeopardize the integrity of the vehicle inspection. Vulnerabilities in the lower priority range are still serious enough that they must be addressed, but because of the lower priority, BAR can wait the additional time. Making the distinction between high and lower findings illustrates that BAR is evaluating the burden on DAD Vendors in addressing security risks. The change is being made this way because having a specific requirement that addresses this situation ensures that an identified security risk will be mitigated.

Section 3.1.11.2: The new requirement “The DAD Vendor shall comply with BAR’s file verification process.” was added because BAR determined that there could be a security vulnerability where the DAD Vendor files could be replaced with malicious files. While BAR has already implemented the file verification process in the current system, there was no supporting requirement in the DAD specification. The change is being made this way because DAD Vendors are required to provide certain confidential file information to BAR as part of this process.

Section 3.1.11.3: The new requirement “The DAD Vendor shall notify BAR of all DAD related changes.” was added because under the original DAD specification, it was possible for DAD Vendors to fix problems without BAR’s knowledge. This requirement ensures that BAR is aware of all fixes that have been implemented. The change is being made this way because BAR typically needs to test a change before permitting its use as part of the certified configuration to ensure performance meeting this DAD specification.

Section 3.1.11.4: The new requirement “The DAD Vendor shall not implement changes without first submitting the change to BAR for testing or review to ensure the DAD continues to meet all the requirements in this DAD specification. DAD related items include for example: DAD hardware, DAD drivers, DAD firmware, DAD firmware update software, DAD user assistance software, and DAD Vendor server interaction with DADs.” was added because under the original DAD specification, it was possible for DAD Vendors to release fixes to stations without BAR’s knowledge. This requirement ensures that BAR is aware of and verifies that the changes work properly before requiring use of the change in stations per an updated certified equipment configuration. The change is being made this way because if BAR does not verify the change, vehicles may be improperly tested, and the DAD may no longer comply with the DAD specification. DAD Vendors are required to update their product as necessary to maintain compliance with the DAD specification, per 3.1.10. The DAD Vendor shall be responsible to update the hardware and/or firmware and/or software to conform to the DAD specification version to which the DAD was certified.

Section 3.1.11.5: The new requirement “DAD change notification to BAR shall include: description, justification, identifying version, impact to BAR and users, documented testing performed by DAD Vendor, intended implementation plan, related risks, and potential cost to end user if applicable.” was added because since the original DAD specification was written, DAD Vendors have made changes initially unknown to BAR that caused their product to be unusable or caused a portion of vehicles to be untestable, thus the new requirement for change notification. The change is being made this way based on over twenty-five years of working with vendors and performing certification testing, the listed items are necessary so BAR can properly identify the change, understand the impact, the proposed implementation, associated risks, and ensure that the DAD Vendor has tested the change in functionality to verify the changes are functioning properly before they are BAR certified for station use.

Section 3.1.11.6: The new requirement “Any change to the DAD Vendor’s hardware shall cause the hardware version number to increase.” was added because under the original DAD specification, it was possible for DAD Vendors to change the hardware without changing the version number. This requirement will prevent this from occurring. The change is being made this way because understanding that a hardware change was made will allow BAR to test it properly to certify the new configuration.

Section 3.1.11.7: The new requirement “Any change to the DAD Vendor’s firmware shall cause the firmware version number to increase.” was added because under the original DAD specification, it was possible for DAD Vendors to change the firmware without changing the version number. This requirement will prevent this from occurring. The change is being made this way because understanding that a firmware change was made will allow BAR to test it properly to certify the new configuration, and to track its performance when used in stations as compared to older versions.

Section 3.1.11.8: The new requirement “Any change to the DAD Vendor’s software shall cause the software version number to increase. This includes all the files necessary to install and operate the DAD.” was added because under the original DAD specification, it was possible for DAD Vendors to change the software without changing the version number. This requirement will prevent this from occurring. The change is being made this way because understanding that a software change was made will allow BAR to test it properly to certify the new configuration.

Section 3.1.12: The phrase “(s)” was added to the word system. This change conveys to the stakeholders that the DAD must operate with more than one computer operating system. The computer operating system on the OIS computer can change on a frequent basis to remain in compliance with the computer operating system requirements in Section 1.2: Scope as well as the State Administrative Manual, as cited above.

Section 3.1.13.1: The new requirement “The DAD shall return communication errors that identify the source of the communication error explicitly; (e.g. The DAD had an internal error, or the vehicle returned an error or bad message, which caused an error).” was added because when communication issues arise between the OIS computer, the DAD and the vehicle, it will be necessary to know the source of the communication error for trouble-shooting the issue. The change is being made this way because stations often call BAR for guidance when a vehicle’s computer fails to communicate with a DAD during a vehicle inspection.

Section 3.1.14: The words “live person” were added to the requirement. In addition, a hyphen “-” was added to the words “toll free” making them “toll-free”. The addition of the words “live person” was necessary because BAR had received feedback from inspectors seeking DAD Vendor help, that they were unable to reach anyone during normal business hours. This change clarifies the inspectors’ desires in this area. The change is being made this way because some inspectors have difficulty using electronic communication and prefer a phone conversation. The addition of the hyphen “-” in “toll- free” was necessary to align the document more closely with the Department of Consumer Affairs Style Guide, Revised August 2019.

Section 3.1.16: The words “live person” were added to the requirement. In addition, the word “Standard” was removed. These changes were necessary because BAR had received feedback from stations seeking DAD Vendor help, that they were unable to reach anyone during normal business hours. This change clarifies the station’s desires in this area. The change is being made this way because some inspectors have difficulty using electronic communication and prefer a phone conversation. In addition, “Standard” was deleted because “Pacific Standard Time” is when standard time is being observed (early November to mid-March), and "Pacific Daylight Time" (PDT) when daylight saving time (mid-March to early November) is being observed. The proper term for California’s time zone that is not specific to daylight savings being in effect or not is called “Pacific Time”.

Section 3.1.19: The word “minimum” was added to the requirement to allow the DAD Vendor community to provide additional free warranty to the stations. As originally written, the DAD Vendor was prevented from offering additional free warranty. The change is being made this way because BAR does not wish to suppress a longer warranty period if offered.

Section 3.1.20: The word “must” was replaced with the word “shall”. There is no discernable difference between how “shall” and “must” are interpreted by BAR. This change was necessary to standardize the language used in BAR regulations.

Section 3.1.21: The word “must” was replaced with the word “shall”. There is no discernable difference between how “shall” and “must” are interpreted by BAR. This change was necessary to standardize the language used in BAR regulations.

Section 3.1.21.1: The new requirement “DADs shall only be branded with company information (logos, etc.) for the DAD Vendor who submitted the devices to BAR and received BAR certification.” was added because this topic was the source of many questions during implementation of the original DAD specification. DAD Vendors desired to rebrand and sell their DADs though third-party sellers. BAR believes that this would confuse the stations and lead to many questions regarding if the station’s DAD was BAR certified. In addition, there would be confusion on who should provide service to the DAD. The change is being made this way because current business arrangements exist between companies that manufacture and submit DADs for BAR certification and other companies with industry name recognition that service and sell other equipment.

Section 3.1.22: The new requirement “The DAD shall support encrypted communications between the Cal-VIS software and the DAD per BAR’s DAD Encryption Specification.” was added because under the original DAD specification, it could be possible for nefarious individuals to intercept and manipulate the data passed from the DAD to the Cal-VIS software. This requirement will prevent this. The change is being made this way because a standardized method of encryption is needed for DADs from different DAD Vendors to all work with the Cal-VIS software. The actual method of encryption is not being spelled out in the regulatory text for reasons of confidentiality.

This is to prevent persons in an adverse position to the state from gaining an improper advantage in manipulating data collected during a vehicle inspection for the purposes of fraudulently certifying a vehicle that should otherwise fail vehicle inspection. Pursuant to Government Code 11340.9(e), specifics which would enable an individual to evade the law need not be promulgated as regulations.

Section 3.1.22.1: The new requirement “When requested by the Cal-VIS software, the DAD shall encrypt all data transmissions.” was added because under the original DAD specification, it could be possible for nefarious individuals to intercept and manipulate the data passed from the DAD to the Cal-VIS software. This requirement will prevent this. The change is being made this way because BAR desires the ability to enable and disable encryption to mitigate risk in the event there is an issue related to encryption preventing DAD use.

Section 3.1.22.2: The new requirement “The DAD Vendor shall notify BAR immediately if they have knowledge of or suspect that the encryption has been compromised.” was added because if the encryption is compromised, nefarious individuals could intercept and manipulate the data passed from the DAD to the Cal-VIS software. This requirement will prevent, or at least mitigate, this risk. The change is being made this way because BAR and the DAD Vendors will need to adjust encryption settings to address the compromise event.

Section 3.1.20: This original requirement “The DAD Vendor shall supply the purchaser with a copy of the Disclosure Agreement (Appendix B of this Specification)” was removed because the original requirement no longer applies as BAR has removed the Disclosure Agreement from the current version of the DAD specification. This was done because the Disclosure Agreement provided no protection to the station and was logistically complicated for both the DAD Vendors and BAR.

Section 3.1.20.1: This original requirement “The BAR Certified DAD Vendor shall obtain the signature of the purchaser acknowledging the provisions of the Disclosure Agreement” was removed because the original requirement no longer applies, as BAR has removed the Disclosure Agreement from the current version of the DAD specification. This was done because the Disclosure Agreement provided no protection to the station and was logistically complicated for both the DAD Vendors and BAR.

Section 3.1.20.2: This original requirement “The BAR Certified DAD Vendor shall provide BAR with a copy of the signed Disclosure Agreement” has been removed. The original requirement no longer applies as BAR has removed the Disclosure Agreement from the current version of the DAD specification. This was done because the Disclosure Agreement provided no protection to the station and was logistically complicated for both the DAD Vendors and BAR.

Section 3.1.23: The new requirement “The DAD shall only interact with Cal-VIS and DAD Vendor servers.” was added because under the original DAD specification, the DAD was not prevented from interacting with non-DAD Vendor websites or servers. Allowing this unknown and untested interaction could cause massive disruption to Smog Check inspections. This requirement will prevent such disruptions. The change is being made this way because BAR can test for and permit DAD interaction with documented DAD Vendor internet locations only.

Section 3.1.23.1: The new requirement “DAD Vendor interaction with the DAD shall not interrupt a vehicle inspection once started.” was added because under the original DAD specification, the DAD Vendors were not prevented from interacting with the DAD during a vehicle inspection. DAD Vendors did this and caused massive disruption to Smog Check inspections. This requirement will prevent such disruption. The change is being made this way because DADs need to interface with servers under the control of the DAD Vendor to update their firmware. However, this action shall not interrupt DAD use during a vehicle inspection.

Section 3.1.23.2: The new requirement “DAD Vendors shall provide BAR a description of all their servers that interact with the DAD outside of the vehicle inspection sequence to support BAR verification of only Cal-VIS and DAD Vendor server interaction.” was added to provide BAR an evaluation criterion to determine if the DAD is correctly communicating outside of the vehicle inspection. This is necessary as BAR will monitor which servers the DAD attempts to communicate with to ensure that non-DAD servers are not being communicated with. If non-DAD servers are being communicated with, this is an indication that the integrity of the vehicle inspection may be compromised.

Global Navigation Satellite System

This DAD specification section explains the Global Navigation Satellite System receiver being added to the DAD. These requirements are being added to assist BAR personnel with ensuring that vehicle inspections are taking place at the actual physical station location. Since the rollout of OIS vehicle inspections in March of 2015, BAR started noticing a trend in which vehicle inspections were not occurring at licensed facilities, which based on the experience of BAR, strongly indicates fraudulent activity. Off-site vehicle inspections are violations of regulations, therefore, BAR’s knowledge of the location of the DAD incentivizes vehicle inspections to occur in licensed facilities and protects the public.

Section 3.1.24: The new requirement “The DAD shall contain a Global Navigation Satellite System (GNSS) receiver capable of receiving transmissions available from satellites of various countries, including but not limited to the Global Positioning System (GPS) and Global Navigation Satellite System (GLONASS) systems.” was added because BAR personnel have observed stations being empty and dark while a vehicle inspection is taking place, supposedly at the location. This requirement will allow BAR personnel to determine where the vehicle inspection is physically taking place and to act upon the station if necessary. The technology required is the most commonly available. The change is being made this way because this is the most technologically feasible way to physically locate the DAD. BAR has investigated other methods including Internet Protocol Address lookup; however, the Internet Protocol Address can be falsified quite easily or can be hidden by use of Virtual Private Network (VPN) software and would not provide the certainty of GNSS.

Section 3.1.24.1: The new requirement “The GNSS receiver shall collect required location and accuracy data per BAR’s DAD Communication Specification.” was added because, under this proposal, the GNSS receiver is part of a certified DAD and when the Cal-VIS software requests its data, it must respond per the stated requirements. The change is being made this way because GNSS data must be stored within the GNSS receiver, so it remembers prior information in support of subsequent hot start (defined after section 3.1.24.4.1 in the DAD specification) capability. The method of collection of this data is not being spelled out in the regulatory text for reasons of confidentiality. This is to prevent persons in an adverse position to the State from gaining an improper advantage in manipulating data collected during a vehicle inspection for the purposes of fraudulently certifying a vehicle that should otherwise fail vehicle inspection. Pursuant to Government Code 11340.9(e), specifics which would enable an individual to evade the law need not be promulgated as regulations.

Section 3.1.24.1.1: The new requirement “The GNSS receiver shall be accurate to within 15 meters horizontally when a GNSS signal is available from 3 or more satellites.” was added because BAR desires sufficient accuracy to find a DAD within a station. The change is being made this way because, in BAR’s experience, fifteen meters is the minimum necessary accuracy for BAR to determine if the DAD device is located near the station’s licensed address. Increasing the accuracy to unnecessary levels beyond this minimum may not be possible given GNSS signals are line of sight dependent, and accuracy degrades due to obstruction or reflectivity in urban environments. A minimum of three satellites are necessary to determine a two-dimensional location (i.e., no altitude).

Section 3.1.24.1.2: The new requirement “The GNSS receiver shall connect to 3 or more satellites when the satellites are available.” was added because a minimum of three satellites are necessary to determine a two-dimensional location (e.g., no altitude). The change is being made this way because when three or more satellites are not available during a GNSS service outage or in the time of war (if, for example, GNSS public access is disabled by the federal government), BAR would not expect devices to achieve the specified accuracy.

Section 3.1.24.1.3: The new requirement “The GNSS receiver shall provide accuracy data to the Cal-VIS software when location and fix had been determined (latitude and longitude are available from the chipset). Examples of accuracy data include horizontal dilution of precision (HDOP), vertical dilution of precision (VDOP), position (3D) dilution of precision (PDOP), etc.” was added because accuracy data cannot be provided when latitude and longitude are not available from the chipset. The change is being made this way because the industry standard National Marine

Electronics Association (NMEA) 0183 Standard for Interfacing Marine Electronic Devices Version 4.10 specifies this functionality and is the least restrictive or burdensome method of obtaining this information.

Section 3.1.24.2: The new requirement “The GNSS receiver shall provide data per the National Marine Electronics Association (NMEA) 0183 Standard for Interfacing Marine Electronic Devices Version 4.10 standard.” was added because an industry standard of operation is necessary for consistent GNSS performance across multiple DAD Vendors submitting devices for BAR certification. The change is being made this way because version 4.10 provides the data that in BAR’s experience is required for fraud detection and prevention yet is available from common off the shelf electronics.

Section 3.1.24.2.1: The new requirement “The GNSS receiver shall support a subset of data formats from the NMEA 0183 Standard for Interfacing Marine Electronic Devices Version 4.10 standard per BAR’s DAD Communication Specification.” was added to inform DAD Vendors BAR has identified the specific subset of data formats required from the standard. This allows BAR to focus on only the data that is necessary to detect and prevent fraud. The change is being made this way because all functionality in the standard is not necessary to satisfy BAR’s business need to locate the DAD and determine the DAD’s proximity to the licensed station address. The subset of data formats is not being spelled out in the regulatory text for reasons of confidentiality. This is to prevent persons in an adverse position to the State from gaining an improper advantage in manipulating data collected during a vehicle inspection for the purposes of fraudulently certifying a vehicle that should otherwise fail vehicle inspection. Pursuant to Government Code 11340.9(e), specifics which would enable an individual to evade the law need not be promulgated as regulations.

Section 3.1.24.3: The new requirement “When requested by the Cal-VIS software, the DAD shall transmit the NMEA formatted current data to the Cal-VIS software per BAR’s DAD Communication Specification.” was added to require the DAD provide the current GNSS data using a common transmission method. The change is being made this way because a standard of transmission is necessary for consistent GNSS performance across multiple DAD Vendors submitting devices for BAR certification. If no format were defined, BAR could get different formats from the various DAD Vendors which BAR would be unable to use, would be unrecognized by the Cal-VIS software, and BAR would be unable to determine if the DAD passes the certification testing. The transmission method is not being spelled out in the regulatory text for reasons of confidentiality. This is to prevent persons in an adverse position to the State from gaining an improper advantage in manipulating data collected during a vehicle inspection for the purposes of fraudulently certifying a vehicle that should otherwise fail the vehicle inspection. Pursuant to Government Code 11340.9(e), specifics which would enable an individual to evade the law need not be promulgated as regulations.

Section 3.1.24.4: The new requirement “The GNSS receiver shall have “cold start,” “warm start,” and “hot start” capability.” was added to convey to the DAD Vendors the three states that the GNSS receiver can exist in at startup. The change is being made this way to reduce the Time to First Fix (TTFF) time delay impact to the vehicle inspection. Per "GPS TTFF and startup modes" (PDF). Measurement Systems Ltd. The TTFFs for a cold start is typically between 2 to 4 minutes, a warm start 45 seconds, and a hot start 22 seconds.

Section 3.1.24.4.1: The new requirement “The GNSS receiver shall provide required location and accuracy data per BAR’s DAD Communication Specification to the Cal-VIS software within 30 seconds after a “hot start” of the GNSS receiver” was added because BAR wishes to limit the maximum time a vehicle inspection is interrupted to capture a GNSS location. The change is being made this way because BAR testing has shown 30 seconds is a reasonable amount of time for reasonably priced off the shelf equipment to respond. Additionally, BAR has included two GNSS receiver data sheets in this package that attest to the fact that this is readily achievable with current devices, as they show hot start capability in one second or less.

The three following paragraphs defining “cold start”, “warm start”, and “hot start” have been added. This was necessary because the DAD Vendors must share the same understanding that BAR has related to these terms.

A cold start is when the GNSS receiver deletes all prior stored information, attempts to locate satellites, and then calculates a GNSS fix. This takes the longest because there is no known information.

A warm start is when the GNSS receiver has estimates of the current time within 20 seconds, the current position within 100 kilometers, the GNSS receiver’s velocity within 25 m/s, and the GNSS receiver has valid almanac data. The GNSS receiver must acquire each satellite signal and obtain that satellite's detailed orbital information, called ephemeris data. Each satellite broadcasts its ephemeris data every 30 seconds and is valid for up to four hours.

A hot start is when the GNSS receiver has valid time, position, almanac, and ephemeris data, enabling a rapid acquisition of satellite signals.

Section 3.1.24.5: The new requirement “When the Cal-VIS software prompts the user to go outside to acquire location data, the DAD shall, without connection to the OIS computer, collect GNSS data for a number of seconds configurable by the Cal-VIS software.” was added to inform the DAD Vendors that the DAD is required to acquire a GNSS signal when it may otherwise be blocked by the building. The change is being made this way because GNSS devices may be unable to communicate with a satellite when communication is obstructed due to various signal blocking interference. GNSS works when a direct line of sight between the device and the satellites is provided. BAR intends to minimize the impact on vehicle inspections and stations by only requiring GNSS data when necessary.

Section 3.1.24.5.1: The new requirement “The DAD shall acquire a GNSS location and fix without connection or communication to the Cal-VIS software.” was added because if the signal is unattainable inside the station the inspector will need to disconnect the DAD from the OIS computer, carry it outside to acquire a GNSS signal. The change is being made this way because a wired or wireless connection to the OIS computer during GNSS data collection may not reach the necessary distance.

Section 3.1.24.5.2: The new requirement “The DAD shall have an external or on- screen button for the user to start acquisition of the location data.” was added because an inspector will need to control when the GNSS data collection starts after carrying the DAD outside of the building. The change is being made this way because an automatic timer will not meet each individual station’s needs and could be too slow for most, thus adding unnecessary vehicle inspection time.

Section 3.1.24.5.2.1: The new requirement “Once the external or on-screen button is pressed, the DAD shall notify the user when a GNSS fix, with a minimum 15-meter accuracy in the horizontal plane, has been established.” was added to make the data collection event more efficient. The change is being made this way because an automatic timer will not meet each individual station’s needs and could be too slow for most, thus adding unnecessary vehicle inspection time. In addition, fifteen meters is the minimum necessary accuracy for BAR to determine if the DAD is located near the station’s licensed address. Increasing the accuracy to unnecessary levels beyond this minimum may not be possible given GNSS signals are line of sight dependent, and accuracy degrades due to obstruction or reflectivity in urban environments.

Section 3.1.24.5.3: The new requirement “The DAD shall have a Light Emitting Diode (LED) indicator on the housing or onscreen notification to indicate the GNSS fix status.” was added because the user must have an indication of when the location fix has been established and when they may return to the vehicle inspection. The change is being made this way based on discussions with existing DAD Vendors.

Section 3.1.24.5.3.1: The new requirement “If a LED indicator is used, it shall blink once per second when no GNSS signal is available.” was added because the user will need to wait until a location fix has been established. The slowly blinking light indicates that a location fix has not yet been established. If a light is used, its blink rate needs to be specified since different blink rates indicate different statuses. The change is being made this way because BAR had entertained the idea of using colored lights to indicate the location fix status. The colored lights were dismissed, and the blinking light used because BAR believes that color blind users could have a difficult time distinguishing between the colors.

Section 3.1.24.5.3.2: The new requirement “If a message is used, it shall contain the wording “No Location Data Available” when no GNSS signal is available.” was added because DAD Vendors have expressed interest in using a design that would display this information on a screen. BAR agreed that would be acceptable. The change is being made this way because this is what the DAD Vendors requested. This requirement standardizes the message which helps with usability if switching DAD brands.

Section 3.1.24.5.3.3: The new requirement “If a LED indicator is used, it shall blink 3 times per second while acquiring a GNSS fix.” Was added because the user will need to wait until a location fix has been established. The light blinking 3 times per second indicates that a location fix has not yet been established. If a light is used, its blink rate needs to be specified since different blink rates indicate different statuses. The change is being made this way because BAR had entertained the idea of using colored lights to indicate the location fix status. The colored lights were dismissed, and the blinking light used because BAR believes that color blind users could have a difficult time distinguishing between the colors.

Section 3.1.24.5.3.4: The new requirement “If a message is used, it shall contain the wording “Acquiring Location Fix” while acquiring a GNSS fix.” was added because DAD Vendors expressed interest in using a design that would display this information on a screen. BAR agreed that would be acceptable. The change is being made this way because this is what the DAD Vendors requested, and BAR desires a standardized message.

Section 3.1.24.5.3.5: The new requirement “If a LED indicator is used, it shall be on and not blinking when a GNSS fix, with a minimum 15-meter accuracy in the horizontal plane, has been established within the last 15 minutes.” was added because the user will need to wait until a location fix has been established. The solid non-blinking light indicates that a location fix has been established. If a light is used, its blink rate needs to be specified since different blink rates indicate different statuses. The change is being made this way because BAR had entertained the idea of using colored lights to indicate the location fix status. The colored lights were dismissed, and the blinking light used because BAR believes that color blind users could have a difficult time distinguishing between the colors.

Section 3.1.24.5.3.6: The new requirement “If a message is used, it shall contain the wording “Location Fix Obtained” when a GNSS fix, with a minimum 15-meter accuracy in the horizontal plane, has been established within the last 15 minutes.” was added because DAD Vendors have expressed interest in using a design that would display this information on screen. The standardized message “location fix obtained” became necessary to aid in training and support of equipment sold by various DAD Vendors.

The change is being made this way because this is what the DAD Vendors requested, and BAR desires a standardized message.

Section 3.1.24.5.4: The new requirement “The DAD shall store the NMEA data in memory until transmitted to the Cal-VIS software.” was added because while the DAD is obtaining a GNSS location fix, it may not be connected to the Cal-VIS software and will need to hold this data until the DAD is reconnected to the Cal-VIS software. The change is being made this way because in BAR’s experience, streaming the data to the Cal-VIS software could be problematic and unreliable. The chosen method is less problematic and more reliable.

Section 3.1.24.5.5: The new requirement “The DAD shall be capable of storing, at a minimum, 300 seconds of GNSS/NMEA 0183 data collected at a frequency of one sample per second.” was added to communicate the amount of location data the DAD is required to store. The change is being made this way because DAD Vendors need to design the DAD with enough memory to meet the requirement without adding unnecessary cost due to excessive memory. BAR experience determined 5 minutes (300 seconds) of data collection adequate time for an inspector to walk outside to acquire a GNSS signal when requested by BAR, assuming building or other interference prevents acquiring a signal while indoors.

Section 3.1.24.5.6: The new requirement “The GNSS receiver shall be contained within the DAD housing.” was added because BAR believes that an externally mounted GNSS receiver is more susceptible to tampering. The change is being made this way because the GNSS is intended to identify the DAD’s location so must be part of the DAD.

Section 3.1.24.5.6.1: The new requirement “The GNSS receiver’s antenna electrical connections shall not be accessible from the outside of the DAD housing.” was added because the GNSS receiver uses its antenna to receive the signals from the satellites. If the electrical connections were accessible from outside of the DAD housing, the GNSS receiver is more susceptible to tampering. The change is being made this way because if the GNSS receiver’s antenna was external to the DAD, it could be separated from the DAD and indicate the antenna position instead of the DAD’s position.

Section 3.1.24.5.7: The new requirement “The DAD shall use the World Geodetic System 1984 standard (WGS84) Datum standard for coordinates.” was added because when applicable, BAR relies upon already established standards. The change is being made this way because these standards are already established and commonly used in the United States.

J2534 Compliant Driver

This DAD specification section explains to the DAD Vendors the addition of a Society of Automotive Engineers (SAE) J2534 compliant driver. SAE J2534 is a communications standard that dictates the way vehicles communicate to external computers and in turn the way external computers communicate to the vehicles. The U.S. Environmental Protection Agency (EPA) and the California Air Resources Board (CARB) had been trying to get vehicle manufacturers to support common emission-related services for the aftermarket. The SAE created the J2534 standard, in 2002, to promote the EPA and CARB in their work. The EPA and CARB mandated the use of J2534 for 2004 and newer model year vehicles. There is an extensive library of commands that can be issued to retrieve data from the vehicle. BAR has chosen to leverage this industry standard in the DAD used in the BAR’s programs. In the existing DADs that are currently being used, BAR chose to use a proprietary standard as the mechanism to pass the commands to and from the vehicles.

Conceptually, there are two ways in which commands will be passed from the OIS computer through the DAD and then to the vehicles. The first method is similar to the way the existing DAD’s commands are passed. In this situation, the OIS computer issues a command to the DAD, the DAD passes this command through the DAD Vendor provided common communication driver and onto the vehicle. This method has had a very high success rate for correctly communicating with vehicles. The drawback to this communication method is that only a limited set of commands are defined in the common communication driver, which limits the nature of the data that can be retrieved from the vehicles. The second method leverages the J2534 library of commands by issuing direct J2534 function calls to the DAD. This method allows a greater diversity of

data to be obtained from the vehicles. It is BAR’s intent to use this greater diversity of data to pinpoint when fraud may be occurring during the vehicle inspection.

Section 3.1.25: The new requirement “The DAD shall accept Cal-VIS software direct J2534 function calls made to the DAD Vendor provided J2534 compliant driver without passing through the IDAD dll.” was added because BAR envisions a time when BAR will be making direct J2534 function calls to the vehicle in support of fraud detection. The change is being made this way because this allows BAR the flexibility to communicate directly with vehicles using the already established J2534 function calls.

Section 3.1.25.1: The new requirement “When the Cal-VIS software makes direct J2534 function calls to the DAD Vendor provided J2534 compliant driver, the DAD Vendor is not responsible for meeting the vehicle connectivity rates specified in this document.” was added because it provides relief to the DAD Vendor on the connectivity rate requirements in this DAD specification. The change is being made this way because without the connectivity rate relief, the DAD Vendors could be unfairly decertified when in fact it was BAR that could cause connectivity problems if errors are made using the direct calls.

Section 3.1.25.2: The new requirement “When the Cal-VIS software makes direct J2534 function calls to the DAD Vendor provided J2534 compliant driver, the DAD shall communicate with the vehicle according to SAE standards.” was added because the change ensures the DAD communicates with vehicles as detailed in the SAE J2534-1 standard when BAR is using the alternate path through DAD controlling software to directly request data for fraud detection purposes. The change is being made in this way because BAR has designed a 'direct' means of requesting new data types through the DAD that do not involve vendor modification to the core vehicle inspection data retrieval path. This design affords BAR expansive flexibility and rapid reactiveness supporting new data type collection in the ever-evolving pursuit of fraud detection.

Section 3.1.26: The new requirement “All Cal-VIS software to vehicle communication shall go through the DAD Vendor provided J2534 compliant driver.” was added because the change standardizes how the communication shall occur. The change is being made this way to standardize the DAD configuration across multiple DAD Vendors.

Section 3.1.26.1: The new requirement “The DAD shall not be capable of programming or reprogramming any vehicle's onboard computer(s) using a J2534 interface.” was added because BAR has received questions on this topic. This change is being made this way because the DAD is meant to be a vehicle testing tool not a vehicle repair tool.

Section 3.1.27: The new requirement “The DAD Vendor provided J2534 compliant driver shall work with Microsoft Windows as outlined in Section 1.2 of this DAD specification.” was added because BAR needs to ensure that there are no compatibility issues between the J2534 compliant driver and the operating system on the OIS computer. When the Cal-VIS software gets updated to work on new operating system versions, this requirement informs DAD Vendors that they may need to update their DAD software accordingly. BAR chose the Microsoft Windows operating system because it is the most widely used in the industry.

Analog Data Sampler

This DAD specification section explains to the DAD Vendors the addition of an Analog Data Sampler within the DAD. This device will collect data from the vehicles. By analyzing this data BAR can detect that fraud is occurring. BAR has done research in this area and has been able to detect fraud using a similar device. However, limitations in the existing DADs prevent BAR from currently implementing this type of fraud detection. Based on the research that BAR has conducted, implementing the Analog Data Sampler will facilitate and enhance BAR’s fraud detection capabilities.

Section 3.1.28: The new requirement “When requested by the Cal-VIS software, the DAD shall measure, store, and transfer data to the Cal-VIS software from an internal Analog Data Sampler device (ADS).” was added to give BAR access to the actual electrical signals used to communicate between the DAD and the vehicle. This is being done because in BAR’s experience this has proven useful in detecting and preventing fraud. Requiring the ADS to be internal rather than external is necessary to protect the ADS from tampering. The ADS device itself is necessary for investigations, but the specifics are not being spelled out in the regulatory text for reasons of confidentiality, to prevent individuals from altering the data and violating law. Pursuant to Government Code 11340.9, investigative techniques or specifics which would enable an individual to evade the law need not be promulgated as regulations.

Section 3.1.28.1: The new requirement “The ADS shall support a minimum of two analog channel inputs.” was added because when vehicles communicate on their internal networks and to external devices, such as the DAD, the vehicle’s communication protocols use two wires (channels) to send the electrical signals. Each wire (channel) carries a mirror image of the data being communicated by the other. By measuring the wires (channels) concurrently, it is possible to eliminate any noise that is occurring in the electrical signals, which allows for better data collection. BAR knows this because that is the way the SAE communication specification is written as well as through BAR’s experimental measurements taken in BAR’s laboratory. The change is being made this way to standardize the DAD configuration across multiple DAD Vendors. In addition, using two channels is the industry standard for collecting this type of analog data.

Section 3.1.28.2: The new requirement “Each channel shall support input ranges from ±50 millivolts (mV) to ±20 Volts (V) as follows:” was added because BAR needs a variety of measurement ranges to improve the measurement resolution of low-level signals. The larger ranges will be used to obtain an overall view of the voltages being returned by the vehicle. After the overall view voltages are analyzed, BAR will be able to focus on the information contained at the lower ranges. The ranges are akin to zooming in or out of a picture to see more detail. With evolving fraud devices, flexibility is necessary to see improper data in various areas. The change is being made this way to standardize the DAD configuration across multiple DAD Vendors.

Within this subsection, nine ranges are identified. Each range is presented here. The reason that these are broken out individually is to communicate that each range stands on its own and will be **individually tested by BAR during certification testing.**

Section 3.1.28.2.1: The new requirement “The measured range between – 50 mV and + 50 mV.” was added to the DAD specification.

Section 3.1.28.2.2: The new requirement “The measured range between – 100 mV and + 100 mV.” was added to the DAD specification.

Section 3.1.28.2.3: The new requirement “The measured range between – 200 mV and + 200 mV.” was added to the DAD specification.

Section 3.1.28.2.4: The new requirement “The measured range between – 500 mV and + 500 mV.” was added to the DAD specification.

Section 3.1.28.2.5: The new requirement “The measured range between – 1 V and + 1 V.” was added to the DAD specification.

Section 3.1.28.2.6: The new requirement “The measured range between – 2 V and + 2 V.” was added to the DAD specification.

Section 3.1.28.2.7: The new requirement “The measured range between – 5 V and + 5 V.” was added to the DAD specification.

Section 3.1.28.2.8: The new requirement “The measured range between – 10 V and + 10 V.” was added to the DAD specification.

Section 3.1.28.2.9: The new requirement “The measured range between – 20 V and + 20 V.” was added to the DAD specification.

Section 3.1.28.3: The new requirement “Each channel shall have 10 equal divisions per measurement range listed under 3.1.28.2. E.g. support input sensitivity from 10 mV per division at the low range to 4 V per division at the high range.” was added to dictate the number of data points within each range. Too few data points will not capture the desired data for fraud detection. In addition, this standardizes the number of divisions to aid data analysis across multiple DAD Vendor’s products. The change is being made this way because ten divisions is industry standard.

Section 3.1.28.4: The new requirement “Each channel shall support the following analog offset ranges: ±250 mV for 50 mV to 200 mV range; ±2.5 V for 500 mV to 2.0 V range; and ±25 V for 5.0 V to 20.0 V range.” was added because if an input signal is outside of the hardware’s range that it has capability to measure, an offset (adding or subtracting a DC voltage to the input signal) is required to bring the input signal within a range capable of being measured. For example, if BAR is attempting to measure in the 50 mV to 200 mV range, but the input signal is 400 mV, an offset of -250 mV would be applied to the input signal, thus bringing the input signal down to 150 mV, which is within the hardware’s measurement capabilities. The ranges were chosen to meet BAR’s business need to identify fraudulent activity. In addition, based on BAR's research and input from the DAD Vendors, the ranges specified are within those ranges typically offered for these types of devices. The change is being made this way because this is an industry standard method of allowing greater range for hardware with limited capability without adding expense.

Section 3.1.28.5: The new requirement “Analog channel-to-channel isolation shall be for direct current (DC) to 50 megahertz (MHz): > 50 decibel (dB).” was added because multi-channel instruments that employ it are immune to inconsistent common mode voltages on any combination of channels, allowing greater measurement accuracy. The change is being made this way because this is an industry standard type of requirement.

Section 3.1.28.6: The new requirement “Analog channel input impedance shall be >= 150 kiloohms (kΩ) and <= 20 picofarad (pF) for each channel.” was added because whenever an electronic measurement tool is attached to a circuit, the measurement tool influences the circuit being measured. In this case, the ADS being attached to the vehicle can influence the vehicles’ circuitry. One of the influences the ADS can have is to allow too much current flow through the combined ADS-vehicle circuit. If this occurs, both the ADS and the vehicle can be damaged. In these types of devices, the input impedance is the parameter used to limit the current flow. BAR determined through DAD Vendor input and inhouse laboratory testing that the input impedance specified will not damage the ADS or the vehicle yet will allow the capture of the electrical signals from inspected vehicles to determine if fraudulent testing is occurring. The change is being made this way because this is an industry standard type of requirement.

Section 3.1.28.7: The new requirement “Analog bandwidth for each channel shall be 50 MHz.” was added because in these types of devices, the analog bandwidth is the parameter used to describe the maximum input signal frequency that the ADS will be required to capture. BAR determined through DAD Vendor input and inhouse laboratory testing that the bandwidth specified will capture the electrical signals from inspected vehicles to determine if fraudulent testing is occurring. The change is being made this way because this is an industry standard type of requirement.

Section 3.1.28.8: The new requirement “The ADS shall be capable of measuring the following calculated rise times at the corresponding frequencies per industry standard T10 to T90.” was added because the ability for an electronic measurement tool to accurately measure rapidly fluctuating electrical signals from inspected vehicles is key to BAR being able to determine if fraudulent testing is occurring. In these types of electronic measurement tools, the rise time is the parameter used to determine the ability to capture this rapidly fluctuating electrical signal. The T10 and T90 are the times that it takes for the electronic measurement tool to measure 10 percent of the signal peak and 90 percent of the signal peak. BAR determined through DAD Vendor input and inhouse laboratory testing that the rise time specified will allow the ADS to capture the electrical signals from inspected vehicles to determine if fraudulent testing is occurring.

Within this subsection, 25 ranges are identified. Each range is presented here. The reason that these are broken out individually is to communicate that each range stands on its own and will be individually tested by BAR during certification testing.

Section 3.1.28.8.1: The new requirement “7 nanoseconds (ns) at 100 Mega Samples per second (MS/s)” was added to the DAD specification.

Section 3.1.28.8.2: The new requirement “14 ns at 50 MS/s.” was added to the DAD specification.

Section 3.1.28.8.3: The new requirement “28 ns at 25 MS/s.” was added to the DAD specification.

Section 3.1.28.8.4: The new requirement “70 ns at 10 MS/s.” was added to the DAD specification.

Section 3.1.28.8.5: The new requirement “140 ns at 5 MS/s.” was added to the DAD specification.

Section 3.1.28.8.6: The new requirement “280 ns at 2.5 MS/s.” was added to the DAD specification.

Section 3.1.28.8.7: The new requirement “700 ns at 1 MS/s.” was added to the DAD specification.

Section 3.1.28.8.8: The new requirement “1.4 microseconds (µs) at 500 Kilo Samples per second (KS/s).” was added to the DAD specification.

Section 3.1.28.8.9: The new requirement “2.8 microseconds (µs) at 250 KS/s.” was added to the DAD specification.

Section 3.1.28.8.10: The new requirement “5.6 µs at 125 KS/s.” was added to the DAD specification.

Section 3.1.28.8.11: The new requirement “14 µs at 50 KS/s.” was added to the DAD specification.

Section 3.1.28.8.12: The new requirement “28 µs at 25 KS/s.” was added to the DAD specification.

Section 3.1.28.8.13: The new requirement “70 µs at 10 KS/s.” was added to the DAD specification.

Section 3.1.28.8.14: The new requirement “140 µs at 5 KS/s.” was added to the DAD specification.

Section 3.1.28.8.15: The new requirement “280 µs at 2.5 KS/s.” was added to the DAD specification.

Section 3.1.28.8.16: The new requirement “700 µs at 1 KS/s.” was added to the DAD specification.

Section 3.1.28.8.17: The new requirement “1.4 microseconds (ms) at 500 Samples per second (S/s).” was added to the DAD specification.

Section 3.1.28.8.18: The new requirement “2.8 microseconds (ms) at 250 S/s.” was added to the DAD specification.

Section 3.1.28.8.19: The new requirement “5.6 ms at 125 S/s.” was added to the DAD specification.

Section 3.1.28.8.20: The new requirement “14 ms at 50 S/s.” was added to the DAD specification.

Section 3.1.28.8.21: The new requirement “28 ms at 25 S/s.” was added to the DAD specification.

Section 3.1.28.8.22: The new requirement “70 ms at 10 S/s.” was added to the DAD specification.

Section 3.1.28.8.23: The new requirement “140 ms at 5 S/s.” was added to the DAD specification.

Section 3.1.28.8.24: The new requirement “280 ms at 2.5 S/s.” was added to the DAD specification.

Section 3.1.28.8.25: The new requirement “700 ms at 1 S/s.” was added to the DAD specification.

Section 3.1.28.9: The new requirement “Each channel of the ADS shall support a switched, positive signal connection to any of the following Diagnostic Link Connector (DLC) pins: 1,2,6,7,10,14,15,16. Each ADS channel will not be required to measure the same pin concurrently.” was added because while the inspector will only connect one plug to the vehicle’s diagnostic connector, BAR needs to measure the signal from one or two of the eight listed pins within the vehicle’s sixteen pin on-board diagnostic connector. Which pins the vehicle communicates on is defined by the externally referenced SAE specification. Since the desired signal exists on pins that vary depending on the vehicle being inspected, the pin connections need to be switched internally in the DAD (ADS), so that the inspector is not required to connect individual wires. The change is being made this way because switching which signal pin is being read is known as multiplexing and is an industry standard method of switching signals pins within a multiple pin connector. In addition, connecting the channels to different pins is more cost effective than an eight-channel device.

Section 3.1.28.10: The new requirement “Each channel of the ADS shall support a switched, positive signal connection to an internal signal generator capable of generating a square wave signal with an amplitude of 5 V.” was added because BAR will be using the ADS to collect data from the vehicles. By analyzing this data BAR can detect that fraud is occurring. BAR has done

research in this area and has been able to detect fraud. To ensure that the ADS is accurately collecting the data from the vehicles, the device will measure a known signal and determine if it is measuring accurately. This calibration verification will give BAR the confidence in the data being collected. The change is being made this way because ensuring that a device is accurate before using it for collecting data is an industry standard practice for this type of device. Locating the calibration source internally protects it from tampering.

Section 3.1.28.11: The new requirement “The negative signal connection from each of the channel inputs shall be connected to pin-5 of the DLC.” was added because voltage measurement devices require both a positive and negative connection. The change is being made this way because per the SAE J1962 201607, "Diagnostic Connector - Equivalent to ISO/DIS 15031-3: December 14, 2001", revised 2016-07-12, pin-5 defined to be the signal ground connection within the vehicle’s OBD connector.

Section 3.1.28.12: The new requirement “The ADS shall be capable of true sample rates from 1 S/s through 100 MS/s for each channel.” was added because in BAR’s experience, this range of sample rate is necessary to measure the desired electrical signals to detect and prevent fraud. The change is being made this way because it is industry standard to specify sample rate in this manner.

Section 3.1.28.13: The new requirement “The ADS inputs shall be protected against overvoltage up to 100 V.” was added because the device may be connected to a vehicle with faulty wiring having up to 100 volts present and the device should be tolerant of this to prevent replacement expense. The change is being made this way because it is industry standard to protect voltage measurement circuitry with an overvoltage level several times higher than the anticipated typical level and existing off-the-shelf equipment like that which would be built to meet these requirements has a 100-volt overvoltage value.

Section 3.1.28.14: The new requirement “The ADS shall support the following analog sample rates (real-time): (100, 50, 25, 10, 5, 2.5, 1) MS/s, (500, 250, 125, 50, 25, 10, 5, 2.5, 1) KS/s, (500, 250, 125, 50, 25, 10, 5, 2.5, 1) S/s. Note to DAD Vendors: the ADS may sample at a higher sample rate and downsample to the values presented here. However, the ADS may not sample at a lower sample rate and upsample to the values presented here.” was added because BAR experience and DAD Vendor input determined that the listed sample rates are necessary to capture the desired electrical signals from inspected vehicles. These specific rates were chosen based on typical rates in readily available technology and BAR’s business need to have variability allowing a wide lens to identify fraudulent data and ability to focus the lens to obtain adequate data at the area of interest. Requiring DAD Vendors to achieve each rate allows BAR to standardize data collection across DAD Vendor products. The change is being made this way because it is industry standard to specify the sample rate capability of this type of device.

Section 3.1.28.14.1: The new requirement “If downsampling is performed, DAD Vendors shall provide to BAR a listing of the DAD’s actual sample rates.” was added to collect information necessary to verify downsampling is done correctly during BAR certification testing of the DAD. BAR is requiring a listing of the true hardware sample rates to support downsampling calculation verification.

Section 3.1.28.15: The new requirement “The ADS DC accuracy shall be ± 3% of full scale.” was added because the data BAR desires to collect would be missed if the ADS did not achieve the specified accuracy. BAR knows this from laboratory experience. The change is being made this way because it is industry standard to specify accuracy in this manner.

Section 3.1.28.16: The new requirement “The ADS time-based accuracy shall be < ± 50 points per million (ppm).” was added because up to 50 points out of a million can be missed or added, yet BAR will still have the necessary data precision to perform fraud detection. BAR knows this from laboratory experimentation. The change is being made this way because it is industry standard to specify accuracy of this type of device by dictating how many samples can be added or missing in the data collected.

Section 3.1.28.17: The new requirement “The ADS shall support the following modes of triggering: (manual, rising edge, falling edge, either edge, greater than pulse width, less than pulse width, window pulse width).” was added because triggering will allow automated start/stop of the ADS to minimize unnecessary data collection which lengthens vehicle inspection time. BAR does not want to burden stations by unnecessarily increasing vehicle inspection times, which would decrease the total number of vehicle inspections able to be performed. The change is being made this way because the listed triggers are common for this type of device.

Section 3.1.28.18: The new requirement “The ADS shall be capable of capturing pre- trigger data up 50 Mega Samples (MS).” was added because the data BAR desires to record may occur prior to a triggering event. BAR laboratory testing has shown one half second of data at 100 Mega Samples per second (50 Mega Samples) is needed to capture the desired signal. The change is being made this way because it is necessary to identify the number of pre trigger samples so DAD Vendors will include enough memory to store the collected data, yet BAR does not want to include unneeded samples which could unnecessarily increase inspection time or equipment cost.

Section 3.1.28.19: The new requirement “The ADS be capable of storing at least 50 MS of ADS data or the ADS shall stream ADS data to the OIS computer at up to the maximum sample rate.” was added because if the DAD to computer connectivity is slowed for a variety of reasons common to an automotive environment the data still needs to be captured, then sent to the OIS computer at a potentially slower rate than it is collected. BAR laboratory testing has shown one half second of data at 100 Mega Samples per second (50 Mega Samples) is needed to capture the desired signal. The change is being made this way because BAR does not wish to lose data due to unforeseen connectivity issues which do occur.

Section 3.1.28.20: The new requirement “When storing samples for transfer, the ADS shall be capable of transferring all sample data to the OIS computer in less than 10 seconds.” was added because a low performing design could be employed without this requirement and BAR desires to minimize vehicle inspection length as much as possible. The change is being made this way because, in BAR’s experience, common connective technologies (e.g., USB 3.0, Wi-Fi) can support this data transfer rate.

Section 3.1.28.21: The new requirement “The DAD shall have a National Institute of Standards and Technology (NIST) traceable (or NIST approved 3rd party traceable certification) calibrated, 0.000 to +5.000 +/- 0.005 V DC square wave at 1 kilohertz (kHz) with 50% duty cycle and 7 ns minimum rise time calibration verification source on each analog channel input.” was added because for BAR to use the data provided by the ADS in analysis, fraud detection and possible

administrative or criminal action, the data must be accurate. A nanosecond (ns) is one billionth (10-9) of a second. The industry standard mechanism used is the comparison of the data captured by the ADS to a known value that is being measured. However, the known value must itself be accurate. The industry standard mechanism used to ensure that the known value is accurate is to use a National Institute of Standards and Technology (NIST) traceable source. NIST is a physical sciences laboratory and a non-regulatory agency of the United States Department of Commerce. NIST supplies industry, academia, government, and other users with artifacts that are certified as having specific characteristics or component content, used as calibration standards for measuring equipment and procedures, quality control benchmarks for industrial processes, and experimental control samples. Companies like Cole Parmer, for example, offer a service to verify that a signal is actually what it claims to be within a certain tolerance, as measured by equipment that was calibrated as compared to the NIST standard. The companies provide a document proving the signal is accurate. For example, we do not know that a yard stick is actually a yard long unless it was compared to a known length yard stick held by a third party, that was in turn, traced back to the universal NIST (gold standard) yard stick. The change is being made this way because tying the calibration source's accuracy to a NIST certified standard is industry standard for calibrating this type of device.

Section 3.1.28.21.1: The new requirement "the calibration verification source shall be capable of presenting the square wave on pin-1 of the self-test connector." was added to standardize the path of the calibration signal into the ADS. The change is being made this way because pin-1 is not used for any of the existing communication protocols and therefore using it for calibration verification will not interfere with any DAD-to-vehicle communication.

Section 3.1.28.21.2: The new requirement "The calibration verification source shall be contained within the DAD." was added to minimize the number of external peripherals used to verify proper DAD operation. The change is being made this way to promote easier user support.

Section 3.1.28.21.3: The new requirement "The DAD shall perform a calibration verification on the ADS through the DAD's J1962 vehicle connector." was added because SAE has specified that vehicles must communicate with external devices, like the DAD, though the SAE specified vehicle connector. This connector is specified in SAE J1962 201607, "Diagnostic Connector - Equivalent to ISO/DIS 15031-3: December 14, 2001", revised 2016-07-12. For BAR to use the data provided by the ADS in analysis, fraud detection, and possible administrative or criminal action, the data must be accurate. For the accuracy of the data to ensured, the entire pathway that the data travels must be included in the calibration verification. The data pathway originates at the vehicle's J1962 vehicle connector, passes to the DAD's J1962 vehicle connector, travels through the cable, and onto the DAD's circuit boards, where it is measured by the ADS. Damage to any of these components could lead to inaccurate readings by the ADS. If any of these components were not included in the calibration verification but were then added back into the data pathway during the ADS data collection, BAR would not be able to depend on the data collected. In addition to possible damage to the components, the electrical resistance of the components must be compensated for as it could bias the measurement. The equation V=IR (based on Ohm's law, which states that the current through a conductor between two points is directly proportional to the voltage across the two points) dictates that if the resistance changes, "R" in the equation, while the current remains unchanged (the "I" in the equation), then the measured voltage changes as well, "V" in the equation. The change is being made this way because by including the entire data pathway in the calibration verification, BAR ensures that the data collected by the ADS is accurate.

Section 3.1.28.21.4: The new requirement “The DAD’s J1962 connector shall be plugged into the self-test connector to perform the calibration verification.” was added because it bundles the new ADS calibration with the existing DAD self-test configuration. The change is being made this way because it minimizes training needed to perform calibration since the same action is required of the inspector as the self-test that they are already doing.

Section 3.1.28.21.5: The new requirement “The calibration verification shall return a pass / fail result when requested by the Cal-VIS software.” was added because if passing, the data will be deemed accurate and usable, and if failing, the DAD may require service. The change is being made this way because a passing calibration result for this data supports its accuracy which is necessary when the data is used to fail vehicles that are tampered or fraudulently inspected.

Section 3.1.28.21.6: The new requirement “The DAD shall enable and disable the calibration verification source upon request by the Cal-VIS software.” was added because the DAD must respond to Cal-VIS software commands. The change is being made this way to provide BAR flexibility in programming the Cal-VIS software to control when a calibration is performed during a vehicle inspection. A calibration may be desired before, during, or after data collection. Matching the calibration event to the data collection period provides confidence in data collected.

Section 3.1.28.22: The new requirement “Calibration or replacement of the ADS shall only be performed by the DAD Vendor at the DAD Vendor’s facility after inspection and quality control checks ensuring that the ADS meets the accuracy requirements of this DAD specification have been successfully completed.” was added because the field service representatives do not possess the knowledge, equipment and personnel required to ensure accuracy required by this DAD specification. DADs are manufactured by the DAD Vendor. A subcontractor or field service representatives from the DAD vendor could be used to replace DADs when broken. The change is being made this way because only the DAD Vendors have in their place of manufacturing, the proper knowledge, and tools to perform proper internal DAD service. Requiring service in house ensures greater oversight and quality control than allowing field personnel to make field repairs. DAD Vendors are responsible for proper DAD repair as they are the parties certified by BAR to perform such actions per the DAD specification incorporated by reference to California Code of Regulation. If DAD were to be repaired improperly BAR does not have the authority to penalize (e.g., decertify) subcontractors from performing field repair, unlike the DAD Vendors who build the DADs, nor does BAR wish to complicate DAD Vendor certifications by amending regulation to include various certifications for various DAD Vendor roles or subcontractors.

Section 3.1.28.23: The new requirement “The DAD Vendor shall deliver to BAR upon request specifications for the ADS and / or its components.” was added because BAR may need to understand a nuance of the design to apply appropriate certification testing methods. The change is being made this way because DAD Vendors may take unique design approaches to meeting BAR’s performance requirements. Besides performance standards, the DAD specification includes requirements for manufacturers to share in confidence with BAR information about their equipment design as necessary to ensure proper BAR certification testing.

Section 3.1.29: The new requirement “The DAD shall be fully functional with a minimum voltage of 10.0 V DC on pin-16 of the J1962 connector, with pin-5 as the ground.” was added because BAR needs to collect a vehicle’s OBD data even if the vehicle’s battery is at a lower than normally charged battery’s resting voltage of 12.6 or operating voltage of 13.5. The change is being made this way because the DAD may need auxiliary power like an internal battery or external power supply for its circuitry if only designed to operate on 12 volts and higher.

Section 3.1.30: The new requirement “The DAD shall be fully functional with a maximum voltage of 32.0 V DC on pin-16 of the J1962 connector, with pin-5 as the ground.” was added because the DAD should not be damaged if subjected to voltage higher than normal in a vehicle. The change is being made this way because it is possible that a broken vehicle may produce a higher-than-normal operating voltage.

Section 3.1.31: The new requirement “The DAD shall be protected against electrostatic discharge (ESD) up to 2,000 V as per IEC 61000-4-2 Level 1, on all electrical connections to the DAD.” was added because the DAD contains sensitive equipment, specifically the ADS, which could be damaged if not shielded from electrostatic discharge that commonly occurs in and around vehicles. The International Electrotechnical Commission (IEC) is an international standards organization that prepares and publishes international standards for all electrical, electronic, and related technologies. IEC 61000-4-2 - International Electrotechnical Commission (IEC) immunity standard on Electrostatic Discharge (ESD), dated 2008-12-09 is the IEC's immunity standard on Electrostatic Discharge (ESD). The publication describes requirements, levels, and test methods to achieve immunity compliance of an electronic product. The purpose is to create a reproducible ground for product compliance and the standard defines: ranges, levels, test equipment, setups, procedures, calibrations, generator waveforms and general uncertainties. The change is being made this way because the IEC is an industry standard for protecting electronic equipment.

Section 3.1.32: The new requirement “The DAD shall measure the resistance between the J1962 connector pin-6 and pin-14.” was added to measure the OBD signal wire resistance. The change is being made this way to compare electronic responses from various vehicles. In BAR’s experience, this data is used in detecting and preventing fraud.

Section 3.1.32.1: The new requirement “The DAD range of resistance measurement shall be from 0 ohms (Ω) through 10 kiloohms (kΩ).” was added because the data BAR desires to capture is within this resistance range. In BAR’s experience, data in this range is used for detecting and preventing fraud. In addition, the change is being made this way because this range is typical for a resistance measurement device in the automotive industry.

Section 3.1.32.2: The new requirement “The DAD shall measure resistance with an accuracy of +/- 10 Ω below 1000 Ω.” was added because without a minimum accuracy, the collected data would not be sensitive enough to support electronic response comparison. The change is being made this way because a tighter accuracy could add unnecessary cost and in BAR’s experience, the range specified is adequate to ensure the desired signal is measured for the detecting and preventing fraud. In addition, this level of accuracy is typical for a resistance measurement device in the automotive industry.

Section 3.1.32.3: The new requirement “The DAD shall measure resistance with an accuracy of +/- 1% of the measured value between 1000 Ω and 9,999 Ω.” was added because a more lenient than typical resistance measurement equipment accuracy is enough to measure the desired electronic responses in this resistance range. The change is being made this way because a tighter accuracy could add unnecessary cost and in BAR’s experience, the range specified is adequate to ensure the desired signal is measured and that BAR can detect and prevent fraud. In addition, level of accuracy is typical for a resistance measurement device in the automotive industry.

Section 3.1.32.4: The new requirement “The DAD shall not be subject to accuracy standards at a measured value of 10 kΩ or greater.” was added because although the DAD may be capable of measuring resistance over 10kΩ, BAR has no use for this data so requires no accuracy in this range. The change is being made this way because a higher range of measurement could add unnecessary cost. This is a typical type of requirement for a resistance measurement device.

Section 3.1.32.5: The new requirement “The DAD resistance raw sample rate shall be at least 120 hertz (Hz).” was added because resistance must be measured quickly enough to accurately capture the electronic responses. In BAR’s experience the sample rate must be this quick to detect and prevent fraud. The change is being made this way because a faster sample rate could add unnecessary cost without appreciable benefit; thus 120 hertz was seen as the point of necessary efficacy. This is a typical type of requirement for a resistance measurement device.

Section 3.1.32.6: The new requirement “The DAD reported resistance reading shall be updated no more than once per second.” was added because BAR anticipates the resistance reading will be static. The change is being made this way because gathering data more than once per second is unnecessary and would not provide any meaningful information. The DAD is required to report the resistance per requirement 3.1.32.

Section 3.1.32.7: The new requirement “The DAD shall present the resistance measurement, as the apparent resistance between the pins, comprised of the mean of at least the last 120 raw samples.” was added because reporting the apparent resistance, even though there may be an induced current, provides a stable and reliable reading when averaged over the number of samples, which results in the goal of data accuracy. While additional samples may yield even tighter accuracy, the additional cost in added vehicle inspection time did not justify a higher sample number than 120, given that this number of samples is a typical in a resistance measurement device.

Section 3.1.32.7.1: The new requirement “The DAD shall report the resistance measurements below 0 as a negative value, using a minus (-) sign, to indicate an error condition.” was added because there should be no current flow when measuring resistance so only positive readings are expected. The change is being made this way because BAR may use the error condition to identify a resistance measurement fault.

Section 3.1.32.8: The new requirement “The DAD resistance measurement shall not be affected by the DAD’s connection to any other J1962 connector pins.” was added because the resistance measurement will be performed when the DAD is connected to all 16 pins of a vehicle’s OBD port. The change is being made this way because the pins not used in the resistance measurement must not contaminate the measured resistance on the desired pins. Such contamination would negatively affect data accuracy.

Section 3.1.32.9: The new requirement “The DAD resistance measurement shall not affect the communications on any J1962 connector communication pins.” was added because the DAD shall still function to collect OBD data even though it contains a device competing for usage on the same pins. The change is being made this way because BAR does not wish to jeopardize critical OBD data collection due to interference from this auxiliary device within the DAD.

Section 3.1.32.10: The new requirement “The DAD shall be capable of measuring resistance on a powered Controller Area Network (CAN) bus in an idle state.” was added because resistance cannot be measured when vehicle computers are actively communicating. The change is being made this way because, per the experience of BAR’s engineering staff in observing the functionality of existing measuring devices, idle state measurement is how the automotive industry measures resistance on a CAN bus.

Section 3.1.32.10.1: The new requirement “The DAD shall not be required to accurately measure resistance on a powered CAN bus in an actively communicating state.” was added as a subpart of 3.1.32.10 above based on the same reasoning. It is necessary to add this section to further clarify that only in an idle state will measuring resistance be expected.

Section 3.1.32.11: The new requirement “The DAD shall not draw in excess of 1 milliamp (mA) of current through the J1962 connector pins during the resistance measurement.” was added because a higher current could damage the vehicle’s computers. This conclusion is based on BAR’s engineering staff’s knowledge of the maximum amperage thresholds of existing vehicle computers, as described in manufacturers’ specifications. The change is being made this way because, per the experience of BAR’s engineering staff, 1 milliamp is industry standard used in resistance measurement equipment commonly used for automotive diagnostics and repair.

Vehicle System Voltage

This DAD specification section explains to the DAD Vendors the addition of measuring the vehicle system voltage.

The new section title **“Vehicle System Voltage”** was added. This was necessary as there is a new requirement in this area.

Section 3.1.33: The new requirement “The DAD shall measure the vehicle system voltage when requested by the Cal-VIS software.” was added because by measuring the vehicle system voltage, BAR determines if the DAD is connected to the vehicle and can instruct the inspector based on the vehicle system voltage returned.

Section 3.2: Specific Requirements

Changes were made to the numbering of the subsections throughout this section to accommodate the addition of new subsections as described below.

Standards

This DAD specification section explains to the DAD Vendors the different standards that apply to the way the DAD works. For example, these include the physical plug the DAD must use to connect to the vehicles, the communication protocols the DAD must use to communicate with the

vehicles, and the radio interference standards. BAR has listed these standard so that any DAD Vendor attempting to build a DAD to these specifications will understand which standards are applicable to each requirement. BAR has chosen these standards because in each requirement area, these are the standards that are applicable. In the areas that deal with how a motor vehicle operates, SAE and ISO standards are used. SAE is a United States-based, globally active professional association and standards developing organization for engineering professionals in various industries. SAE's principal emphasis is placed on global transport industries such as aerospace, automotive, and commercial vehicles. ISO is an independent, non-governmental international organization with a membership of 167 national standards bodies that brings together experts to share knowledge and develop voluntary, consensus-based, market relevant International Standards.

Section 3.2.1: The words "the Society of Automotive Engineers / International Organization for Standardization (SAE/ISO)" were replaced with "any externally referenced standard" and the words "SAE/ISO specification" were replaced with "externally referenced standard". These changes were necessary because the updated DAD specification incorporates additional functionality that is beyond the scope of the previous standards.

Section 3.2.1.1: The words "an SAE or ISO requirement" were replaced with the words "any externally referenced standard" because the updated DAD specification incorporates additional functionality that is beyond the scope of the previous standards.

Section 3.2.2: The words ", (OBD II Scan Tool) requirements, as detailed in SAE J1978" were replaced with "200204,". In addition, the word "published" was replaced with "revised". Finally, the "-30" was removed from the date. These changes were necessary to accurately name the document.

Section 3.2.3: The words ", APR 2002" were replaced with the words "201607, "Diagnostic Connector – Equivalent to ISO/DIS 15031-9: December 14, 2001", revised 2016-07". This change was necessary to accurately refer to the current standard published in 2016 now that the prior standard published in 2002 is marked historical by SAE. The 2016 standard was updated in response to California Air Resources Board request to clarify the access area to the vehicle diagnostic connector to provide proper clearance for the mating of the scan tool connector. This vehicle-manufacturer-focused addition has no impact on the DAD specification audience building the DAD (aka scan tool).

Section 3.2.4: The words "201702," were added near the beginning. The words "published 2010-09-28" were replaced with the words "revised 2017-02". These changes were necessary to accurately refer to the current standard published in 2017 now that the prior standard published in 2010 is marked historical by SAE. The 2017 version is incorporated by reference in the California Air Resources Board regulation related to OBD vehicle requirements: Title 13, CCR Section 1968.2. *Malfunction and Diagnostic System Requirements—2004 and Subsequent Model-Year Passenger Cars, Light-Duty Trucks, and Medium-Duty Vehicles and Engines* and Section 1971.1. *On- Board Diagnostic System Requirements—2010 and Subsequent Model-Year Heavy Duty Engines*. 13 CCR 1968.2 establishes emission standards and other requirements for onboard diagnostic systems (OBD II systems) that are installed on 2004 and subsequent model-year passenger cars, light-duty trucks, and medium-duty vehicles and engines certified for sale in California. The OBD II systems, through the use of an onboard computer(s), shall monitor emission systems in-use for the actual life of the vehicle and shall be capable of detecting

malfunctions of the monitored emission systems, illuminating a malfunction indicator light (MIL) to notify the vehicle operator of detected malfunctions, and storing fault codes identifying the detected malfunctions.

Section 3.2.5: The new requirement "The DAD shall be compliant with SAE J1979-2 202104, "E/E Diagnostic Test Modes: OBDonUDS", issued 2021-04." was added because the updated DAD specification incorporates additional functionality that is beyond the scope of the original DAD specification. Specifically, OBDII data request parameters were included for newer model year vehicles using the Unified Diagnostic Services communication protocol. The DAD must use these new parameters and retrieve data as requested by the Cal-VIS software to provide BAR OBDII data as necessary to determine emission control component pass/fail status. The change is being made this way because SAE specifications are updated to include additional functionality designed into new vehicles with enhanced OBDII requirements as determined by the California Air Resources Board (CARB).

Section 3.2.6: The new requirement "The DAD shall be compliant with SAE J1979-DA 202104, "Digital Annex of E/E Diagnostic Test Modes", issued 2021-04." was added to include the digital annex (DA) document paired to the current J1979-2 parent document published in 2021 now that the prior standard published in 2010 is marked historical by SAE. As above in 3.2.4, this newer document is incorporated by reference by the California Air Resources Board regulation at 13 CCR 1968.2. The J1979-DA document contains accompanying changes to the 2021 parent document publication and lists all the individual data address requests necessary for the Cal-VIS software to request through the DAD the OBDII data during a vehicle inspection. The change is being made this way because SAE specifications are updated to include additional functionality designed into new vehicles with enhanced OBDII requirements as determined by CARB.

Section 3.2.7: The new requirement "The DAD shall be compliant with SAE J2534-1 201510. "Recommended Practice for Pass-Thru Vehicle Programming", revised 2015- 10." was added because the updated DAD is required to include hardware and software built to the J2534 standard. The change is being made this way because the J2534 type of communication with the DAD and vehicle provides for a standardized communication to be built by all DAD Vendors. A standard communication is desirable to simplify testing and support interchangeability of equipment brand with identical data provided for vehicle inspection consistency. The J2534 architecture supports BAR ability to request unique OBDII data types from vehicles without requesting DAD Vendor's make changes to their software, thereby allowing BAR to react quicker to evolving OBDII data simulator development.

Section 3.2.7.1: The new requirement "Section 7.2.2 of J2534-1 201510, "Recommended Practice for Pass-Thru Vehicle Programming", revised 2015-10 specifies the <Timestamp> parameter. The DAD shall accurately record and store this parameter with a resolution of 0.000 001 seconds (1 microsecond) and an accuracy of +/- 0.000 001 seconds (1 microsecond). (Note: the SAE specification only requires 0.001 second resolution)." was added because this fast-moving data cannot be compared across vehicles without a highly precise and accurate time stamp. The change is being made this way because it supports comparison of electronic responses from various vehicles. In BAR's experience, this level of accuracy is necessary to detect and prevent fraud.

Section 3.2.7.1.1: The new requirement “For ISO14230 and ISO9141 communication protocols, the DAD shall return the <Timestamp> as specified in section 7.2.2 of J2534- 1 201510, “Recommended Practice for Pass-Thru Vehicle Programming”, revised 2015- 10 for each byte of a message received, with the accuracy specified in Section 3.2.7.1 of this document for appropriate communication protocols.” was added because a timestamp can only be assigned for each byte of data for vehicles with the ISO14230 or ISO9141 OBDII communication protocols. Vehicles using different OBDII communication protocols string messages together, so individual byte timing is not possible. The change is being made this way because a standard data format is desirable to simplify testing and support interchangeability of equipment brands with identical data provided for vehicle inspection consistency.

Section 3.2.8: The new requirement “The DAD shall be compliant with ISO 14229- 1:2020 “Road vehicles – Unified diagnostic services (UDS)”, dated 2020-02.” was added because to determine if vehicles have properly operating emission control systems, BAR needs to collect critical OBDII data from newer model year vehicles that only communicate on the UDS protocol. The change is being made this way because CARB enhances the OBDII regulations to require vehicle manufacturers include new data for climate change, fraud detection, and pollution reduction analysis purposes.

Section 3.2.9: The new requirement “The DAD shall report GNSS data compliant with the National Marine Electronics Association’s (NMEA) 0183 Standard for Interfacing Marine Electronic Devices version 4.10 standard, dated June 2012.” was added because the new GNSS functionality must operate per industry standard specification. The change is being made this way because a standard data format is required to simplify testing and support interchangeability of equipment brands with identical data provided for vehicle inspection consistency. If the standard was not used, then custom programing would be required on BAR’s part for each DAD Vendor, which would be costly to BAR.

Section 3.2.10: The word “Computer” was replaced with the word “computer” as the word was not intended to be capitalized. This was done as general clean-up of the document. The letter “B” was replaced with the letter “A” because the original DAD specification references the wrong class of device. Finally, the words “dated 04-03- 2023” were added to specify the date of the standard being used. The Federal Communications Commission (FCC) is responsible for regulating electromagnetic compatibility emissions in the United States. FCC Part 15 guidelines outline two major types of digital devices: Class A and Class B. Class A devices are intended for industrial environments, while Class B devices are intended for residential use. Since the DAD is intended to be used in industrial environments, Class B is applicable.

Log Files

This DAD specification section explains to the DAD Vendors how the collection and transmission of the log files shall occur. Log files can be thought of as the base level raw commands and data that is used to run the DAD. It is important to have these as sometimes what is happening during the collection of data can be obscured by upper- level business logic.

Section 3.2.11.1: The word “data” was replaced with the words “(aka Vehicle Communication Data Log) data per BAR’s DAD Communication Specification” to clarify which log file is being discussed. In addition, the original DAD specification did not standardize the log file format. This has led to difficulty in reading and automating the analysis of the log files. This requirement

corrects this deficiency. The format is not being spelled out in the regulatory text for reasons of confidentiality. This is to prevent persons in an adverse position to the state from gaining an improper advantage in manipulating data collected during a vehicle inspection for the purposes of fraudulently certifying a vehicle that should otherwise fail vehicle inspection. Pursuant to Government Code 11340.9(e), specifics which would enable an individual to evade the law need not be promulgated as regulations.

Section 3.2.11.1.2: The word “standard” and the words “that is compatible with Microsoft Excel/Word 2003/2007/2010” were removed because the Microsoft products mentioned are not used in the processing of this data. The change is being made this way because only the text formatted in ASCII needs to be required to allow continued use of BAR’s automated reader of the DAD-Vehicle Communications Log.

Section 3.2.7.1.4: This was the requirement number in the original DAD specification. The requirement was removed because BAR will communicate to the DAD Vendors the specific data formats required per BAR’s DAD Communication Specification. The change is being made this way to standardize the DAD-Vehicle Communication Log files across multiple DAD Vendors. The contents of the log file are not being spelled out in the regulatory text for reasons of confidentiality. This is to prevent persons in an adverse position to the state from gaining an improper advantage in manipulating data collected during a vehicle inspection for the purposes of fraudulently certifying a vehicle that should otherwise fail vehicle inspection. Pursuant to Government Code 11340.9(e), specifics which would enable an individual to evade the law need not be promulgated as regulations.

Section 3.2.11.1.3: The words “remaining lines of the” were removed, as requirement

Section 3.2.7.1.4 was removed, and the removed words made the requirement confusing.

Section 3.2.7.1.6: Even though it appears that this requirement is out of order due to the numbering, it is discussed here as this is where it appears in the underline and strike-out version of the updated DAD specification. This requirement was removed because the original DAD specification did not standardize the log file format. This has led to difficulty in reading and automating the analysis of the log files. Removing this requirement in conjunction with the changes made to Section 3.2.12.1 corrects this deficiency.

Section 3.2.7.1.7: Even though it appears that this requirement is out of order due to the numbering, it is discussed here as this is where it appears in the underline and strike-out version of the updated DAD specification. This requirement was removed because the original DAD specification did not standardize the log file format. This has led to difficulty in reading and automating the analysis of the log files. Removing this requirement in conjunction with the changes made to Section 3.2.12.1 corrects this deficiency.

Text following Section 3.2.11.2.1: The text “The NWA will collect the log data, encrypt the log data, and place the encrypted log file(s) on the local computer” was removed, as this is no longer how the encryption will work. Specifying the details of encryption in regulation would present an opportunity for regulatory evasion, and thus the specifics are not described here, pursuant to Government Code section 11340.9.

Section 3.2.11.3: The word “local” was replaced with the word “OIS”. This was done as the word “local” was not used anywhere else when discussing the OIS computer. The replacement creates greater clarity in the DAD specification.

Section 3.2.7.4: Even though it appears that this requirement is out of order due to the numbering, it is discussed here as this is where it appears in the underline and strike- out version of the updated DAD specification. This requirement has been removed, as this is no longer how the encryption will work. Specifying the details of encryption in regulation would present an opportunity for regulatory evasion, and thus the specifics are not described here, pursuant to Government Code section 11340.9.

Testable Vehicles

This DAD specification section explains to the DAD Vendors which vehicles will be tested using the DAD. These include gasoline vehicles with OBDII, diesel vehicles 1998 and newer, alternately fueled vehicles with OBDII, and hybrid vehicles.

Section 3.2.12: The words “201702, “E/E Diagnostic Test Modes”, revised 2017-02, SAE J1979-2 202104, “E/E Diagnostic Test Modes: OBDonUDS”, Issued 2021-04, and SAE J1979-DA 202104, “Digital Annex of E/E Diagnostic Test Modes”, Issued 2021-04” were added as the original title of the SAE specification referenced was incomplete.

Stating the full title removes any possibility of confusion and provides clarity to the reader.

Section 3.2.13: The words “201702, “E/E Diagnostic Test Modes”, revised 2017-02, SAE J1979-2 202104, “E/E Diagnostic Test Modes: OBDonUDS”, Issued 2021-04, and SAE J1979-DA 202104, “Digital Annex of E/E Diagnostic Test Modes”, Issued 2021-04” were added as the original title of the SAE specification referenced was incomplete.

Stating the full title removes any possibility of confusion and provides clarity to the reader.

Section 3.2.14: The words “201702, “E/E Diagnostic Test Modes”, revised 2017-02, SAE J1979-2 202104, “E/E Diagnostic Test Modes: OBDonUDS”, Issued 2021-04, and SAE J1979-DA 202104, “Digital Annex of E/E Diagnostic Test Modes”, Issued 2021-04” were added as the original title of the SAE specification referenced was incomplete.

Stating the full title removes any possibility of confusion and provides clarity to the reader.

Section 3.2.15: The words “201702, “E/E Diagnostic Test Modes”, revised 2017-02, SAE J1979-2 202104, “E/E Diagnostic Test Modes: OBDonUDS”, Issued 2021-04, and SAE J1979-DA 202104, “Digital Annex of E/E Diagnostic Test Modes”, Issued 2021-04” were added as the original title of the SAE specification referenced was incomplete.

Stating the full title removes any possibility of confusion and provides clarity to the reader.

Connectivity Rate

This DAD specification section explains to the DAD Vendors how successful the DAD shall be at communicating with the different vehicle groups. It is important for the DAD to communicate with a very high proportion of the vehicle fleet to ensure that the Smog Check program is successful in reducing vehicle pollution.

Text following Connectivity Rate: The word “car” was replaced with the word “vehicle” to clarify the connectivity rates apply to multiple vehicle types and not just cars.

Section 3.2.16: The abbreviation (MY) was removed as it was only used a few times and provided no value to the requirement. The words “priority one data” were added in front of the words “connectivity rate”. This was done as there were two different connectivity rates discussed within this single requirement and there was the possibility of confusion about which connectivity rate is being discussed. A hyphen “-”, changing “ninety-nine point nine zero” to “ninety-nine-point nine zero” was added. This was necessary to align the document more closely with the Department of Consumer Affairs Style Guide, Revised August 2019.

The remainder of this requirement was split into two paragraphs that follow the new requirement 3.2.16.1. This was done as the remainder of the requirement did not contain any requirement, only an explanation of how BAR shall adjust the connectivity rates.

Section 3.2.16.1: The new requirement “The DAD Vendor shall maintain a non-priority one data connectivity rate of ninety-nine-point nine zero percent (99.90%), which includes vehicles noncompliant with the required SAE and ISO standards as specified by the ARB OBDII regulation (title 13, California Code of Regulations, sections 1968.1 and 1968.2).” was added because the original requirement contained two connectivity rate requirements. These two requirements have been split to improve clarity and prevent confusion.

The two paragraphs split from remaining text from requirement 3.2.16 have been modified as follows.

> BAR shall adjust these connectivity rates in zero-point one zero percent (0.10%) increments to ensure uniform and consistent tests. The connectivity rate shall be lowered if all DADs by all DAD Vendors are technically incapable of retrieving all of the data. Both connectivity rates are set initially to ninety-nine-point nine zero percent (99.90%) but can be adjusted independently of each other.
>
> For example, the priority one data connectivity rate could be set to 99.90% while the connectivity rate for non-priority one data could be set to 99.10%. Priority one data is defined under the “Successful Communication” section.

The edits to these two paragraphs are due to the splitting of the two comingled connectivity rates into two clearly distinctive connectivity rates. This has been done to improve the clarity of how BAR shall adjust the connectivity rates and prevent confusion.

Section 3.2.17: The abbreviation “MY” was replaced with the words “Model Year” to increase the clarity of the requirement. The words “priority one data” were added in front of the words “connectivity rate”. This was done as there were two different connectivity rates discussed within

this single requirement and there was the possibility of confusion about which connectivity rate is being discussed. A hyphen “-”, changing “ninety-nine point nine zero” to “ninety-nine-point nine zero” was added. This was necessary to align the document more closely with the Department of Consumer Affairs Style Guide, Revised August 2019.

The remainder of this requirement was split into two paragraphs that follow the new requirement 3.2.17.1. This was done as the remainder of the requirement did not contain any requirement, only an explanation of how BAR shall adjust the connectivity rates.

Section 3.2.17.1: The new requirement “The DAD Vendor shall maintain a non-priority one data connectivity rate of ninety-nine-point nine zero percent (99.90%), which includes vehicles noncompliant with the required SAE and ISO standards as specified by the ARB OBDII regulation (title 13, California Code of Regulations, sections 1968.1 and 1968.2).” was added because the original requirement contained two connectivity rate requirements. These two requirements have been split to improve clarity and prevent confusion.

The two paragraphs split from remaining text from requirement 3.2.17 have been modified as follows.

> BAR shall adjust these connectivity rates in zero-point one zero percent (0.10%) increments to ensure uniform and consistent tests. The connectivity rate shall be lowered if all DADs by all DAD Vendors are technically incapable of retrieving all of the data. Both connectivity rates are set initially to ninety-nine-point nine zero percent (99.90%) but can be adjusted independently of each other.
>
> For example, the priority one data connectivity rate could be set to 99.90% while the connectivity rate for non-priority one data could be set to 99.10%. Priority one data is defined under the “Successful Communication” section.

The edits to these two paragraphs are due to the splitting of the two comingled connectivity rates into two clearly distinctive connectivity rates. This has been done to improve the clarity of how BAR shall adjust the connectivity rates and prevent confusion.

Section 3.2.18: The word “MY” was replaced with the words “Model Year” to increase the clarity of the requirement. The words “priority one data” were added in front of the words “connectivity rate”. This was done as there were two different connectivity rates discussed within this single requirement and there was the possibility of confusion about which connectivity rate is being discussed. A hyphen “-”, changing “ninety-nine point nine zero” to “ninety-nine-point nine zero” was added. This was necessary to align the document more closely with the Department of Consumer Affairs Style Guide, Revised August 2019.

The remainder of this requirement was split into two paragraphs that follow the new requirement 3.2.18.1. This was done as the remainder of the requirement did not contain any requirement, only an explanation of how BAR shall adjust the connectivity rates.

Section 3.2.18.1: The new requirement “DAD Vendor shall maintain a non-priority one data connectivity rate of ninety-nine-point nine zero percent (99.90%), which includes vehicles noncompliant with the required SAE and ISO standards as specified by the ARB OBDII regulation (title 13, California Code of Regulations, sections 1968.1 and 1968.2).” was added because the original requirement contained two connectivity rate requirements. These two requirements have been split to improve clarity and prevent confusion.

The two paragraphs split from remaining text from requirement 3.2.18 have been modified as follows.

> BAR shall adjust these connectivity rates in zero-point one zero percent (0.10%) increments to ensure uniform and consistent tests. The connectivity rate shall be lowered if all DADs by all DAD Vendors are technically incapable of retrieving all of the data. Both connectivity rates are set initially to ninety-nine-point nine zero percent (99.90%) but can be adjusted independently of each other.
>
> For example, the priority one data connectivity rate could be set to 99.90% while the connectivity rate for non-priority one data could be set to 99.10%. Priority one data is defined under the “Successful Communication” section.

The edits to these two paragraphs are due to the splitting of the two comingled connectivity rates into two clearly distinctive connectivity rates. This has been done to improve the clarity of how BAR shall adjust the connectivity rates and prevent confusion.

Section 3.2.19: The word “MY” was replaced with the words “Model Year” to increase the clarity of the requirement. The words “priority one data” were added in front of the words “connectivity rate”. This was done as there were two different connectivity rates discussed within this single requirement and there was the possibility of confusion about which connectivity rate is being discussed. A hyphen “-”, changing “ninety-nine point nine zero” to “ninety-nine-point nine zero” was added. This was necessary to align the document more closely with the Department of Consumer Affairs Style Guide, Revised August 2019. The words “providing the necessary accommodations for” were removed as they were not found in any of the other similar connectivity requirements and their addition prompted confusion. Their removal provided greater consistency and clarity for the reader.

The remainder of this requirement was split into two paragraphs that follow the new requirement 3.2.19.1. This was done as the remainder of the requirement did not contain any requirement, only an explanation of how BAR shall adjust the connectivity rates.

Section 3.2.19.1: The new requirement “DAD Vendor shall maintain a non-priority one data connectivity rate of ninety-nine-point nine zero percent (99.90%), which includes vehicles noncompliant with the required SAE and ISO standards as specified by the ARB OBDII regulation (title 13, California Code of Regulations, sections 1968.1 and 1968.2).” was added because the original requirement contained two connectivity rate requirements. These two requirements have been split to improve clarity and prevent confusion.

The two paragraphs split from remaining text from requirement 3.2.19 have been modified as follows.

> BAR shall adjust these connectivity rates in zero-point one zero percent (0.10%) increments to ensure uniform and consistent tests. The connectivity rate shall be lowered if all DADs by all DAD Vendors are technically incapable of retrieving all of the data. Both connectivity rates are set initially to ninety-nine-point nine zero percent (99.90%) but can be adjusted independently of each other.
>
> For example, the priority one data connectivity rate could be set to 99.90% while the connectivity rate for non-priority one data could be set to 99.10%. Priority one data is defined under the "Successful Communication" section.

The edits to these two paragraphs are due to the splitting of the two comingled connectivity rates into two clearly distinctive connectivity rates. This has been done to improve the clarity of how BAR shall adjust the connectivity rates and prevent confusion.

Section 3.2.20: The new requirement: "The DAD Vendor shall provide the necessary hardware, firmware, and software to ensure vehicles that only communicate on UDS OBD protocol maintain a priority one data connectivity rate of ninety-nine-point nine zero percent (99.90%), which includes vehicles noncompliant with the required SAE and ISO standards as specified by the ARB OBDII regulation (title 13, California Code of Regulations, sections 1968.1 and 1968.2)." was added because newer vehicles will be using the UDS OBDII protocol and the connectivity rates of these vehicles must be addressed. The requirement was written in this manner as it mimics the other communication protocol connectivity requirements.

Section 3.2.20.1: The new requirement: "The DAD Vendor shall maintain a non-priority one data connectivity rate of ninety-nine-point nine zero percent (99.90%), which includes providing the necessary accommodations for vehicles noncompliant with the required SAE and ISO standards as specified by the ARB OBDII regulation (title 13, California Code of Regulations, sections 1968.1 and 1968.2)." was added because there are two connectivity rates to be contended with. These two requirements have been split to improve clarity and prevent confusion. In addition, the requirement was written in this manner as it mimics the other communication protocol connectivity requirements.

The following two paragraphs have been added:

> "BAR shall adjust these connectivity rates in zero-point one zero percent (0.10%) increments to ensure uniform and consistent tests. The connectivity rate shall be lowered if all DADs by all DAD Vendors are technically incapable of retrieving all of the data. Both connectivity rates are set initially to ninety-nine-point nine zero percent (99.90%) but can be adjusted independently of each other.
>
> For example, the priority one data connectivity rate could be set to 99.90% while the connectivity rate for non-priority one data could be set to 99.10%. Priority one data is defined under the "Successful Communication" section."

These two paragraphs have been added to mimic how the other connectivity rates discussions are presented. This has been done to improve the clarity of how BAR shall adjust the connectivity rates and prevent confusion.

These changes are necessary because CARB advised BAR that their recent regulation, CCR, Title 13, Section 1968.2, adopted 11/22/2022, contains UDS requirements for newer vehicles will be implemented in some newer model year vehicles and in all vehicles in subsequent model years. The original DAD specification did not address these newer vehicles. This requirement addresses those vehicles. The change is being made this way because the DAD must have a very high rate of connecting to these vehicles to retrieve required OBDII data during a vehicle inspection. The 99.9% standard is necessary to ensure almost all vehicles communicate with vehicle inspection equipment to prevent consumer inconvenience for an untestable vehicle due to faulty vehicle inspection equipment. BAR has used this standard over the last seven years and found it to be an adequate level to ensure minimal inconvenience.

Section 3.2.23: The word “must” was replaced with the word “shall”. There is no discernable difference between how “shall” and “must” are interpreted by BAR. This change was necessary to standardize the language used in BAR regulations.

Section 3.2.23.1: The word “must” was replaced with the word “shall”. There is no discernable difference between how “shall” and “must” are interpreted by BAR. This change was necessary to standardize the language used in BAR regulations.

Successful Communication

This DAD specification section explains to the DAD Vendors how BAR defines successful communication. This is necessary as only successful communication attempts are counted toward the connectivity rates noted above.

Section 3.2.24.1: The words “For vehicles which use the OBDII communication services $01 to $0A (OBD Classic vehicles),” were added to the beginning of the sentence because newer vehicles will be coming on the market and the original DAD specification did not distinguish between the older and newer vehicles. The older vehicles are now referred to as “OBD Classic vehicles” per SAE J1979-2 202104, “E/E Diagnostic Test Modes: OBDonUDS”, issued 2021-04, to distinguish between the two groups. In addition, the capital “P” at the beginning of the word “Priority” was replaced with a lower case “p”. This change was necessary as the word “priority” is no longer the beginning of the sentence.

Section 3.2.24.2: The new requirement “For UDS OBDII vehicles, priority one data is the following data: Service $22 support DIDs $F400, $F420, $F440, $460, $480, $F500; Service $22 DID $F501: Service $22 DID $F401 (if it is supported); Service $22 DID $F41C: Service $22 DID $F40C; Service $22 DID $F800; Service $22 DID $F801; Service $22 DID $F802; Service $19 DTCInformationType $42 FunctionalGroupIdentifier $33 DTCStatusMask $08 DTCSeverityMask $02; Service $19 DTCInformationType $42 FunctionalGroupIdentifier $33 DTCStatusMask $04 DTCSeverityMask $02; Service $19 DTCInformationType $55 FunctionalGroupIdentifier $33. UDS OBD is a subset of UDS services which are defined in ISO 14229-1 and specified by ISO 27145.” This change was necessary because CARB advised BAR that their recent regulation changes to Title 13, California Code of Regulations, sections 1968.2 and 1971.1, adopted 11/22/2022, contain UDS requirements for newer vehicles will be implemented in some newer model year vehicles and

in all vehicles in subsequent model years. The original DAD specification did not address these newer vehicles. This requirement addresses those vehicles. The change is being made this way because the DAD Vendors must know what data will be expected from vehicles using the UDS protocol.

Communication Protocols

This DAD specification section explains to the DAD Vendors the different communication protocols that the DAD will have to communicate on. Communication protocols change as vehicle model years continue forward.

Section 3.2.26: The words “dated 1996-12” were added to match the actual name of the specification. This was done to allow the DAD Vendors to know exactly which specification is being relied upon. This helps to avoid confusion and increase clarity.

Section 3.2.26.1: The words “at http://www.obdclearinghouse.com/index.php?body=get_file&id=1380 or available” were replaced with “Version 3.0, dated 11/20/2009 and produced by Volkswagen Group of America,” because website addresses can change, making this avenue unavailable to the DAD Vendors. This requirement clarifies the version, date, author of the document, and that the document is available from BAR.

Section 3.2.26.2: The word “must” was replaced with the word “shall” in two places. There is no discernable difference between how “shall” and “must” are interpreted by BAR. This change was necessary to standardize the language used in BAR regulations.

Section 3.2.27: The phrase “June 2006” was replaced with “200606, Class B Data Communication Network Interface, Reaffirmed 2006-06”. This was done to match the actual name of the specification. This change allows the DAD Vendors to know exactly which specification is being relied upon. This helps to avoid confusion and increase clarity.

Section 3.2.27.1: The words “, 200606, Class B Data Communication Network Interface, Reaffirmed 2006-06” were added to the name of the referenced document. This was done to match the actual name of the specification. This change allows the DAD Vendors to know exactly which specification is being relied upon. This helps to avoid confusion and increase clarity.

Section 3.2.28: The phrase “June 2006” was replaced with “200606, Class B Data Communication Network Interface, Reaffirmed 2006-06”. This was done to match the actual name of the specification. This change allows the DAD Vendors to know exactly which specification is being relied upon. This helps to avoid confusion and increase clarity.

Section 3.2.28.1: The words “, 200606, Class B Data Communication Network Interface, Reaffirmed 2006-06” were added to the name of the referenced document. This was done to match the actual name of the specification. This change allows the DAD Vendors to know exactly which specification is being relied upon. This helps to avoid confusion and increase clarity.

Section 3.2.29: The word “2000” was replaced with “Road vehicles – Diagnostic systems -” and the phrase “- Part 4: Requirements for emission-related systems, dated 2000-06-01,” was added to the name of the referenced document. This was done to match the actual name of the specification. This change allows the DAD Vendors to know exactly which specification is being relied upon. This helps to avoid confusion and increase clarity.

Section 3.2.29.1: The words “, Version 3.0, dated 11/20/09” were added to the name of the specification. This was done to match the actual name of the specification. This change allows the DAD Vendors to know exactly which specification is being relied upon. This helps to avoid confusion and increase clarity.

Section 3.2.29.3: The words “: Road vehicles - Diagnostic systems - Keyword protocol 2000 - Part 4: Requirements for emission-related systems, dated 2000-06-01,” were added to the name of the referenced document. This was done to match the actual name of the specification. This change allows the DAD Vendors to know exactly which specification is being relied upon. This helps to avoid confusion and increase clarity.

Section 3.2.30: The new requirement “The DAD shall be capable of communicating with vehicles using raw Controller Area Network (CAN) (11 bit header, 500 kbaud compatible) communication protocol.” was added because the original DAD specification did not require the raw data. The change is being made this way because in BAR’s experience, the raw data will be necessary to BAR in analyzing the vehicle’s data to detect and prevent fraud. As fraud has been evolving since the inception of the OIS vehicle inspection, BAR requires new tools to combat fraud and protect consumers from vehicles that may be broken and expensive to bring into compliance with the California’s vehicle inspection programs.

Section 3.2.31: The new requirement “The DAD shall be capable of communicating with vehicles using raw Controller Area Network (CAN) (29 bit header, 500 kbaud compatible) communication protocol.” was added because the original DAD specification did not require the raw data. The change is being made this way because in BAR’s experience, the raw data will be necessary to BAR in analyzing the vehicle’s data to detect and prevent fraud. As fraud has been evolving since the inception of the OIS vehicle inspection, BAR requires new tools to combat fraud and protect consumers

from vehicles that may be broken and expensive to bring into compliance with the California’s vehicle inspection programs.

Section 3.2.32: The word “2005” was replaced with “Road vehicles – Diagnostic communication over”, the phase “Do” and the phrase “- Part 4: Requirements for emission-related systems, dated 2021-07,” was added to the name of the referenced document. This was done to match the actual name of the specification. This change allows the DAD Vendors to know exactly which specification is being relied upon. This helps to avoid confusion and increase clarity.

Section 3.2.33: The word “2005” was replaced with “Road vehicles – Diagnostic communication over Controller Area Network (Do” and the phrase “) - Part 4: Requirements for emission-related systems, dated 2021-07,” was added to the name of the referenced document. This was done to match the actual name of the specification. This change allows the DAD Vendors to know exactly which specification is being relied upon. This helps to avoid confusion and increase clarity.

Section 3.2.34: The new requirement “The DAD shall be capable of communicating with vehicles using SAE J1979-2, 202104, E/E Diagnostic Test Modes: OBDonUDS, issued 2021-04”, published April 2021, UDS communication protocol.” was added because CARB advised BAR that their recent regulation, (CCR, Title 13, Section 1968.2, adopted 11/22/2022), contains UDS requirements for newer vehicles that will be implemented in some 2024 model year vehicles and in all vehicles in later model years. The original DAD specification did not address these newer vehicles. This requirement addresses those vehicles. The change is being made this way because it identifies the standard that will be used. This standard contains the technical details for the DAD to communicate with and to retrieve OBDII data from 2024 and newer model year vehicles as necessary for a vehicle inspection.

Initialization Sequence

This DAD specification section explains to the DAD Vendors how communication with the vehicles will be done. This is important, as some vehicles have non-standard ways of communicating and some vehicles can be harmed if this is not done correctly.

Section 3.2.36: The word “a” was removed and the letter “(s)” was added because with the newer vehicles coming on the market, using the UDS protocol, it is anticipated that the default communication protocols developed under the original DAD specification may be inadequate and more than one sequence may be needed. If this change was not made, newer vehicles may not be able to communicate with the DAD.

Section 3.2.36.1: The requirement was reworded from “The DAD Vendor shall select the default communication protocol sequence because it has been demonstrated in use to have high success.” to “The DAD Vendor shall select the default communication protocol sequence(s) because of demonstrated high success rates.” This change was necessary because with the newer vehicles coming on the market, using the UDS protocol, it is anticipated that the default communication protocol sequences may developed under the original DAD specification may be inadequate and more than one sequence may be needed. If this change was not made, newer vehicles may not be able to communicate with the DAD.

Section 3.2.36.2: The letter “(s)” was added because with the newer vehicles coming on the market, using the UDS protocol, it is anticipated that the default communication protocols developed under the original DAD specification may be inadequate and more than one sequence may be needed. If this change was not made, newer vehicles may not be able to communicate with the DAD.

Section 3.2.36.3: The new requirement “The default communication protocol sequence(s) shall be provided to BAR in writing upon request.” was added because BAR has had difficulty in obtaining the default communication protocol sequence(s) from the DAD Vendors. Default communication protocol sequences allow BAR to know how the DAD is going to attempt to communicate with the vehicle. Some vehicles may not communicate when the default communication protocol sequence is followed. The change is being made this way because the requirement will ensure that BAR always has access to the required information to help determine why a vehicle may fail to communicate with a DAD.

Section 3.2.37: The words “rather than with the default communication protocol sequence.” were removed because the phrase was redundant and added no value. Removing the redundant phase increases readability and clarity for the reader.

Section 3.2.37.2: The letter “(s)” was added because with the newer vehicles coming on the market, using the UDS protocol, it is anticipated that the default communication protocols developed under the original DAD specification may be inadequate and more than one sequence may be needed. If this change was not made, newer vehicles may not be able to communicate with the DAD.

Section 3.2.38: The words “Measures to be considered to achieve this include, but are not limited to:” were removed because the sentence was not a requirement and was not appropriate for the DAD specification.

Section 3.2.30.1: Even though it appears that this requirement is out of order due to the numbering, it is discussed here as this is where it appears in the underline and strike- out version of the updated DAD specification. The language “Altering the sequence for initialization after unsuccessful first attempts such as changing the order that protocols are attempted if the vehicle failed to communicate on the first go around or ‘relaxing’ tolerances/specifications on repeat requests to try and be more tolerant of non- compliant vehicles, etc” was removed because this was not a requirement and was not appropriate for the DAD specification. The language is not a requirement because it does not require the DAD or DAD Vendor to do anything. The language merely suggests what could be done.

Section 3.2.30.2: Even though it appears that this requirement is out of order due to the numbering, it is discussed here as this is where it appears in the underline and strike- out version of the updated DAD specification. The language “Having the ability to simultaneously attempt initialization on different protocols (where allowed by SAE and ISO specifications) to facilitate faster initialization” was removed because this was not a requirement and was not appropriate for the DAD specification. The language is not a requirement because it does not require the DAD or DAD Vendor to do anything. The language merely suggests what could be done.

Section 3.2.30.3: Even though it appears that this requirement is out of order due to the numbering, it is discussed here as this is where it appears in the underline and strike- out version of the updated DAD specification. The language “Repeating initialization attempts on the same protocol consecutively before moving on to the next protocol if such an approach is advantageous” was removed because this was not a requirement and was not appropriate for the DAD specification. The language is not a requirement because it does not require the DAD or DAD Vendor to do anything. The language merely suggests what could be done.

Section 3.2.39: The words “for OBD Classic” were added because newer vehicles will be coming on the market and the original DAD specification did not distinguish between the older and newer vehicles. The older vehicles are now referred to as “OBD Classic vehicles” to distinguish between the two groups.

Removal of the title “OBDII Dynamic Data Collection”

This title was removed because the two requirements following were removed.

Section 3.2.32: Even though it appears that this requirement is out of order due to the numbering, it is discussed here as this is where it appears in the underline and strike- out version of the updated DAD specification. The original requirement “Upon request by the NWA, the DAD shall report PID(s) to the NWA.” was removed because the requirements 3.2.46, 3.2.47, and 3.2.47.1 already address this. The change is being made this way because removal eliminates redundancy, creates a more concise document, and improves clarity.

Section 3.2.32.1: Even though it appears that this requirement is out of order due to the numbering, it is discussed here as this is where it appears in the underline and strike- out version of the updated DAD specification. The original requirement “The DAD shall be able to transmit a subsequent request (for the same or next PID) within ten (10) msecs of the vehicle being ready to accept such a request per the applicable SAE and ISO specifications” was removed because the addition of the J2534 requirements make this requirement redundant. The J2534 specification contains an equivalent requirement. The change is being made this way because removal eliminates redundancy, creates a more concise document, and improves clarity.

Removal of the title “OBDII Static Data Collection”

This title was removed because the requirement following was removed.

Section 3.2.33: Even though it appears that this requirement is out of order due to the numbering, it is discussed here as this is where it appears in the underline and strike- out version of the updated DAD specification. The original requirement “The DAD shall collect OBDII data from the vehicle per the NWA request.” was removed because the requirements 3.2.46, 3.2.47, and 3.2.47.1 already address this. The change is being made this way because removal eliminates redundancy, creates a more concise document, and improves clarity.

Negative Response Codes

This DAD specification section explains to the DAD Vendors that vehicles may respond to DAD communication with what is known as Negative Response Codes. The codes let that DAD know that the vehicle understands what is being asked for, but the vehicle may not be able to supply the data at this time.

Section 3.2.40.1: The phase “201702, “E/E Diagnostic Test Modes”, revised 2017-02” was added to the name of the referenced document. This was done to match the actual name of the specification. This change allows the DAD Vendors to know exactly which specification is being relied upon. This helps to avoid confusion and increase clarity.

Section 3.2.40.2: The phase “201702, “E/E Diagnostic Test Modes”, revised 2017-02” was added to the name of the referenced document. This was done to match the actual name of the specification. This change allows the DAD Vendors to know exactly which specification is being relied upon. This helps to avoid confusion and increase clarity.

Section 3.2.40.3: The word “as” was replaced with the words “until the maxwait time”. The words “is met” were added before the closing parenthesis. The word “before” was replaced with “then”. These changes were necessary because the original DAD specification incorrectly identified the value sent as P2max, when the value sent is actually maxwait time. This change was necessary as the original DAD specification was not clear in the defining what meeting the maxwait time meant.

Section 3.2.41: The words “for OBD Classic” were added because newer vehicles will be coming on the market and the original DAD specification did not distinguish between the older and newer vehicles. The older vehicles are now referred to as “OBD Classic vehicles” to distinguish between the two groups.

Section 3.2.41.1: The phrase “201702, “E/E Diagnostic Test Modes”, revised 2017-02” was added to the name of the referenced document. This was done to match the actual name of the specification. This change allows the DAD Vendors to know exactly which specification is being relied upon. This helps to avoid confusion and increase clarity.

Not Supported, Not Available, Not Valid Items

This DAD specification section explains to the DAD Vendors vehicles may respond to DAD communication with garbled or corrupted data. This data is still valuable to BAR and should still be collected and passed on to BAR. In addition, the DAD shall not ask the vehicle for information that the vehicle does not have. Some vehicles can be harmed if this is done.

Removal of the title “Verification of Responses”: The title “Verification of Responses” was removed because the words were inadvertently left in the original DAD specification and refer to requirements that were removed prior to publication. Given that there are no regulatory requirements associated with this title, this is a non- substantive change.

ECU Address Format

This DAD specification section explains to the DAD Vendors how to format the Electronic Control Unit (ECU) address when the data is sent to the Cal-VIS software. Vehicles have communication networks, and the ECUs are the computers on the network. For the network to be able to properly work, the ECUs have network addresses.

Section 3.2.44.1: The new requirement “The ECU Address format shall only apply to addresses not transmitted directly to the Cal-VIS software by the J2534 dll.” was added to advise DAD Vendors that they are not responsible for properly formatting ECU address when BAR bypasses the DAD Vendor’s DAD drivers and makes a direct data request to the DAD through the J2534 software driver (dll). The change is being made this way because BAR needs the directly requested data returned in its raw format to identify fraud.

Section 3.2.44.3: The words “OBD Classic” were added because newer vehicles will be coming on the market and the original DAD specification did not distinguish between the older and newer vehicles. The older vehicles are now referred to as “OBD Classic vehicles” to distinguish between the two groups.

Protocol Name Format

This DAD specification section explains to the DAD Vendors that if they need to create a custom communication protocol to talk to a vehicle, they shall provide BAR with the custom communication protocol name.

OBD Classic Data Collection

This is a new title in the DAD specification. The words “OBD Classic Data Collection” were added because newer vehicles will be coming on the market and the original DAD specification did not distinguish between the older and newer vehicles. The older vehicles are now referred to as “OBD Classic vehicles” to distinguish between the two groups.

Section 3.2.46: The new requirement “For OBD Classis Vehicles, the DAD shall collect OBDII data from the vehicle per the Cal-VIS software request.” was added because several similar requirements existed throughout the DAD specification. Grouping these various requirements eliminates redundancy, creates a more concise document, and improves clarity.

Removal of the title “Acquiring Mode $01, PID Count and Support List Information”

This title was removed because the requirement following was removed.

Section 3.2.40: Even though it appears that this requirement is out of order due to the numbering, it is discussed here as this is where it appears in the underline and strike- out version of the updated DAD specification. The original requirement “If indicated by the NWA, the DAD shall request Mode $01 PID Count and Support List information.” was removed because it is not necessary to list individual Mode and PID data addresses since these are already included in the higher-level requirements 3.2.46, 3.2.47, 3.2.47.1, and the SAE specification referenced herein. The change is being made this way because removal eliminates redundancy, creates a more concise document, and improves clarity.

Removal of the titles “PID Count” and “PID Support List”: The words “PID Count” and “PID Support List” were removed because this is not a function the DAD performs, as discussed above.

Removal of the title “Acquiring Mode $01, PID $01 Information”

This title was removed because the requirement following was removed.

Section 3.2.41: Even though it appears that this requirement is out of order due to the numbering, it is discussed here as this is where it appears in the underline and strike- out version of the updated DAD specification. The original requirement “If indicated by the NWA, the DAD shall request Mode $01 PID $01.” was removed because it is not necessary to list individual Mode and PID data addresses since these are already included in the higher-level requirements 3.2.46, 3.2.47, 3.2.47.1, and the SAE specification referenced herein. The change is being made this way because removal eliminates redundancy, creates a more concise document, and improves clarity.

Removal of the title "Acquiring Mode $01, PID $1C (OBD Compliance) and PID $0C (Engine Speed) Data"

This title was removed because the two sub-titles and two requirements following were removed.

The sub-title "OBD Compliance (Mode $01 PID $1C)" was removed as it was redundant with the title that it appears under.

Section 3.2.42: Even though it appears that this requirement is out of order due to the numbering, it is discussed here as this is where it appears in the underline and strike- out version of the updated DAD specification. The original requirement "If indicated by the NWA, the DAD shall request Mode $01 PID $1C." was removed because it is not necessary to list individual Mode and PID data addresses since these are already included in the higher-level requirements 3.2.46, 3.2.47, 3.2.47.1, and the SAE specification referenced herein. The change is being made this way because removal eliminates redundancy, creates a more concise document, and improves clarity.

The sub-title "Engine Speed (Mode $01 PID $0C)" was removed as it was redundant with the title that it appears under.

Section 3.2.43: Even though it appears that this requirement is out of order due to the numbering, it is discussed here as this is where it appears in the underline and strike- out version of the updated DAD specification. The original requirement "If indicated by the NWA, the DAD shall request the engine speed in accordance with the applicable communication protocol." was removed because it is not necessary to list individual Mode and PID data addresses since these are already included in the higher-level requirements 3.2.46, 3.2.47, 3.2.47.1, and the SAE specification referenced herein. The change is being made this way because removal eliminates redundancy, creates a more concise document, and improves clarity.

Removal of the title "Acquiring Mode $03, Confirmed Emission-Related Diagnostic Trouble Code"

This title was removed because the requirement following was removed.

Section 3.2.44: Even though it appears that this requirement is out of order due to the numbering, it is discussed here as this is where it appears in the underline and strike- out version of the updated DAD specification. The original requirement "If indicated by the NWA, the DAD shall retrieve the confirmed DTCs (Mode $03) from the vehicle in accordance with this section and SAE J1979." was removed because it is not necessary to list individual Mode and PID data addresses since these are already included in the higher-level requirements 3.2.46, 3.2.47, 3.2.47.1, and the SAE specification referenced herein. The change is being made this way because removal eliminates redundancy, creates a more concise document, and improves clarity.

Removal of the title "Acquiring Mode $09, InfoTypes $01 and $02 Vehicle Identification Number (VIN) Data"

This title was removed because the requirement following was removed.

Section 3.2.45: Even though it appears that this requirement is out of order due to the numbering, it is discussed here as this is where it appears in the underline and strike- out version of the updated DAD specification. The original requirement “If indicated by the NWA, the DAD shall request Mode $09 InfoType $02 information.” was removed because it is not necessary to list individual Mode and PID data addresses since these are already included in the higher-level requirements 3.2.46, 3.2.47, 3.2.47.1, and the SAE specification referenced herein. The change is being made this way because removal eliminates redundancy, creates a more concise document, and improves clarity.

Removal of the title “Acquiring Mode $09, InfoTypes $03 and $04 Calibration Identification (CAL ID) Data”

This title was removed because the two requirements following were removed.

Section 3.2.46: Even though it appears that this requirement is out of order due to the numbering, it is discussed here as this is where it appears in the underline and strike- out version of the updated DAD specification. The original requirement “If indicated by the NWA, the DAD shall retrieve the CAL ID (Mode $09 InfoType $04) from the vehicle in accordance with this section and SAE J1979.” was removed because it is not necessary to list individual Mode and PID data addresses since these are already included in the higher-level requirements 3.2.46, 3.2.47, 3.2.47.1, and the SAE specification referenced herein. The change is being made this way because removal eliminates redundancy, creates a more concise document, and improves clarity.

Section 3.2.47: Even though it appears that this requirement is out of order due to the numbering, it is discussed here as this is where it appears in the underline and strike- out version of the updated DAD specification. The original requirement “If an ECU reports more than one (1) CAL ID, the DAD shall report the received CAL IDs to the NWA for that ECU in the same order received from the vehicle (i.e., for each ECU that responds with multiple CAL IDs, the DAD shall use the same order as received to report the CAL IDs for that vehicle ECU to the NWA).” was removed because it is not necessary to list individual Mode and PID data addresses since these are already included in the higher-level requirements 3.2.46, 3.2.47, 3.2.47.1, and the SAE specification referenced herein. The change is being made this way because removal eliminates redundancy, creates a more concise document, and improves clarity.

Removal of the title “Acquiring Mode $09, InfoTypes $05 and $06 Calibration Verification Number (CVN) Data”

This title was removed because the five requirements following were removed.

Section 3.2.48: Even though it appears that this requirement is out of order due to the numbering, it is discussed here as this is where it appears in the underline and strike- out version of the updated DAD specification. The original requirement “the DAD shall retrieve the CVN (Mode $09 InfoType $06) from the vehicle in accordance with this section and SAE J1979.” was removed because it is not necessary to list individual Mode and PID data addresses since these are already included in the higher-level requirements 3.2.46, 3.2.47, 3.2.47.1, and the SAE specification referenced herein. The change is being made this way because removal eliminates redundancy, creates a more concise document, and improves clarity.

Section 3.2.49: Even though it appears that this requirement is out of order due to the numbering, it is discussed here as this is where it appears in the underline and strike- out version of the updated DAD specification. The original requirement “If an ECU reports more than one (1) CVN, the DAD shall report the received CVNs to the NWA for that ECU in the same order received from the vehicle (i.e., for each ECU that responds with multiple CVNs, the DAD shall use the same order as received to report the CVNs for that vehicle ECU to the NWA).” was removed because it is not necessary to list individual Mode and PID data addresses since these are already included in the higher- level requirements 3.2.46, 3.2.47, 3.2.47.1, and the SAE specification referenced herein. The change is being made this way because removal eliminates redundancy, creates a more concise document, and improves clarity.

Section 3.2.50: Even though it appears that this requirement is out of order due to the numbering, it is discussed here as this is where it appears in the underline and strike- out version of the updated DAD specification. The original requirement “For all protocols, the DAD shall comply with SAE J1979 section 6.2.4.3 “Data Not Available within P2 Timing” for InfoType $06.” was removed because it is not necessary to list individual Mode and PID data addresses since these are already included in the higher- level requirements 3.2.46, 3.2.47, 3.2.47.1, and the SAE specification referenced herein. The change is being made this way because removal eliminates redundancy, creates a more concise document, and improves clarity.

Section 3.2.51: Even though it appears that this requirement is out of order due to the numbering, it is discussed here as this is where it appears in the underline and strike- out version of the updated DAD specification. The original requirement “If a request for CVN results in a $78 negative response code message, the DAD shall report $78 to the NWA.” was removed because the SAE specifications already address this. The change is being made this way because removal eliminates redundancy, creates a more concise document, and improves clarity.

Section 3.2.52: Even though it appears that this requirement is out of order due to the numbering, it is discussed here as this is where it appears in the underline and strike- out version of the updated DAD specification. The original requirement “If a request for CVN results in a $22- conditions not correct negative response code message, the DAD shall report $22 to the NWA.” was removed because the SAE specifications already address this. The change is being made this way because removal eliminates redundancy, creates a more concise document, and improves clarity.

Removal of the title “Acquiring Mode $01, PIDs $30 (Number of Warm-ups Since Codes Cleared), $31 (Distance Traveled Since Codes Cleared), $4E (Engine Run Time Since Codes Cleared), $21 (Distance Traveled With MIL On) and $4D (Engine Run Time With MIL On), Data”

This title was removed because the three sub-titles and three requirements following were removed.

The sub-title “Number of Warm-ups Since Codes Cleared (Mode $01 PID $30):” was removed as it was redundant with the title that it appears under.

Section 3.2.53: Even though it appears that this requirement is out of order due to the numbering, it is discussed here as this is where it appears in the underline and strike- out version of the updated DAD specification. The original requirement “If indicated by the NWA, the DAD shall

retrieve the number of warm-ups since codes cleared from the vehicle in accordance with this section and SAE J1979." was removed because it is not necessary to list individual Mode and PID data addresses since these are already included in the higher-level requirements 3.2.46, 3.2.47, 3.2.47.1, and the SAE specification referenced herein. The change is being made this way because removal eliminates redundancy, creates a more concise document, and improves clarity.

The sub-title "Distance Traveled Since Codes Cleared (Mode $01 PID $31) and Engine Run Time Since Codes Cleared (Mode $01 PID $4E):" was removed as it was redundant with the title that it appears under.

Section 3.2.54: Even though it appears that this requirement is out of order due to the numbering, it is discussed here as this is where it appears in the underline and strike- out version of the updated DAD specification. The original requirement "If indicated by the NWA, the DAD shall retrieve the Distance Traveled Since Codes Cleared from the vehicle in accordance with this section and SAE J1979." was removed because it is not necessary to list individual Mode and PID data addresses since these are already included in the higher-level requirements 3.2.46, 3.2.47, 3.2.47.1, and the SAE specification referenced herein. The change is being made this way because removal eliminates redundancy, creates a more concise document, and improves clarity.

The sub-title "Distance Traveled With MIL On (Mode $01 PID $21) and Engine Run Time With MIL On (Mode $01 PID $4D):" was removed as it was redundant with the title that it appears under.

Section 3.2.54: Even though it appears that this requirement is out of order due to the numbering, it is discussed here as this is where it appears in the underline and strike- out version of the updated DAD specification. The original requirement "If indicated by the NWA, the DAD shall retrieve the Distance Traveled With MIL On from the vehicle in accordance with this section and SAE J1979." was removed because it is not necessary to list individual Mode and PID data addresses since these are already included in the higher-level requirements 3.2.46, 3.2.47, 3.2.47.1, and the SAE specification referenced herein. The change is being made this way because removal eliminates redundancy, creates a more concise document, and improves clarity.

Removal of the title "Acquiring Mode $07 (Pending Emission-Related DTCs) and Mode $0A (Permanent Emission-Related DTCs) Data"

This title was removed because the requirement following was removed.

Section 3.2.56: Even though it appears that this requirement is out of order due to the numbering, it is discussed here as this is where it appears in the underline and strike- out version of the updated DAD specification. The original requirement "If indicated, by the NWA, the DAD shall retrieve the Pending Emission-Related DTCs (Mode $07) from the vehicle in accordance with this section and SAE J1979." was removed because it is not necessary to list individual Mode and PID data addresses since these are already included in the higher-level requirements 3.2.46, 3.2.47, 3.2.47.1, and the SAE specification referenced herein. The change is being made this way because removal eliminates redundancy, creates a more concise document, and improves clarity.

Removal of the title "Acquiring Mode $06 Test ID (TID) Support and Test Limit Type and Component ID (TLTCID) Support/Mode $06 OBD Monitor ID (OBDMID) Support and Test ID (TID) Support Data"

This title was removed because the requirement following was removed.

Section 3.2.57: Even though it appears that this requirement is out of order due to the numbering, it is discussed here as this is where it appears in the underline and strike- out version of the updated DAD specification. The original requirement "If indicated, as required by the NWA, the DAD shall retrieve the test results (Mode $06) from the vehicle in accordance with this section and SAE J1979" was removed because it is not necessary to list individual Mode and PID data addresses since these are already included in the higher-level requirements 3.2.46, 3.2.47, 3.2.47.1, and the SAE specification referenced herein. The change is being made this way because removal eliminates redundancy, creates a more concise document, and improves clarity.

Removal of the title "Acquiring Mode $09, InfoTypes $0A (ECU Name)"

This title was removed because the two requirements following were removed.

Section 3.2.58: Even though it appears that this requirement is out of order due to the numbering, it is discussed here as this is where it appears in the underline and strike- out version of the updated DAD specification. The original requirement "If indicated, as required by the NWA, the DAD shall retrieve the ECU Name (Mode $09 InfoType $0A) from the vehicle in accordance with this section and SAE J1979." was removed because it is not necessary to list individual Mode and PID data addresses since these are already included in the higher-level requirements 3.2.46, 3.2.47, 3.2.47.1, and the SAE specification referenced herein. The change is being made this way because removal eliminates redundancy, creates a more concise document, and improves clarity.

Section 3.2.59: Even though it appears that this requirement is out of order due to the numbering, it is discussed here as this is where it appears in the underline and strike- out version of the updated DAD specification. The original requirement "The DAD shall not request InfoType $09 (number of messages to report ECU Name) nor require InfoType $09 to be supported before requesting InfoType $0A (ECU Name)." was removed because it is not necessary to list individual Mode and PID data addresses since these are already included in the higher-level requirements 3.2.46, 3.2.47, 3.2.47.1, and the SAE specification referenced herein. The change is being made this way because removal eliminates redundancy, creates a more concise document, and improves clarity.

Removal of the title "Acquiring Mode $09, InfoTypes $07 and $08/$0B In-Use Monitor Performance Ratio (IUMPR) Data"

This title was removed because the requirement following was removed.

Section 3.2.60: Even though it appears that this requirement is out of order due to the numbering, it is discussed here as this is where it appears in the underline and strike- out version of the updated DAD specification. The original requirement “If indicated, as required by the NWA, the DAD shall retrieve the IUMPR data (Mode $09 InfoType $08/$0B) from the vehicle in accordance with this section and SAE J1979.” was removed because it is not necessary to list individual Mode and PID data addresses since these are already included in the higher-level requirements 3.2.46, 3.2.47, 3.2.47.1, and the SAE specification referenced herein. The change is being made this way because removal eliminates redundancy, creates a more concise document, and improves clarity.

Removal of the title “Sending Mode $04 (Clear/Reset Emission-Related Diagnostic Information)”

This title was removed because the requirement following was removed.

Section 3.2.60: Even though it appears that this requirement is out of order due to the numbering, it is discussed here as this is where it appears in the underline and strike- out version of the updated DAD specification. The original requirement “If indicated by the NWA, the DAD shall send Mode $04 to the vehicle.” was removed because it is not necessary to list individual Mode and PID data addresses since these are already included in the higher-level requirements 3.2.46, 3.2.47, 3.2.47.1, and the SAE specification referenced herein. The change is being made this way because removal eliminates redundancy, creates a more concise document, and improves clarity.

UDS OBD Data Collection

This is a new title in the DAD specification. The words “UDS OBD Data Collection” were added because newer vehicles will be coming on the market and the original DAD specification did not distinguish between the older and newer vehicles. The newer vehicles are now referred to as “UDS OBD vehicles” to distinguish between the two groups.

Section 3.2.47: The new requirement “For UDS OBD vehicles, the DAD shall collect OBDII data from the vehicle per the Cal-VIS software request.” was added because the older group of vehicles “OBD Classic Vehicles” have been addressed and a similar requirement for the newer “UDS OBD vehicles” was needed. Adding this requirement assures that both groups of vehicles are addressed. The requirement was written like this because mirroring other requirements creates consistency and improves clarity.

Section 3.2.47.1: The new requirement “The DAD shall properly assemble, as indicated in the messages themselves, multiple frame messages.” was added because BAR believes that the SAE specifications do not adequately address this area. The addition clarifies BAR’s intentions.

Addition of the word “Physical” prior to the title “Hardware”: The word “Physical” was added to the title “Hardware” because the word was inadvertently left out of the original DAD specification and refers to requirements in the following four sub-titled sections. The addition provides clarity and improves readability.

This DAD specification section explains to the DAD Vendors the requirements for the physical properties of the DAD.

Cabling

This DAD specification section explains to the DAD Vendors the requirements for any cabling that the DAD uses.

Section 3.2.48: The requirement was reworded from “The cable between the DAD and the BAR OIS Computer must be USB 2.0 compliant” to “The cable between the DAD and the OIS computer shall be sufficient to transmit the data specified throughout this document” because the requirement now allows greater flexibility for the DAD Vendor to use whatever cable they desire, as long as it meets the DAD specification. This moves the requirement back to a performance standard rather than the less-desirable prescriptive standard to meet a regulatory goal.

Section 3.2.49: The requirement was reworded from “The DAD cable(s) shall be fifteen feet (15’) ± six inches (6”), between the SAE J1962 201607, "Diagnostic Connector - Equivalent to ISO/DIS 15031-3: December 14, 2001", revised 2016-07 Type A or Type B vehicle connector and the BAR-OIS Computer.” to “The cable between the DAD and the SAE J1962 201607, "Diagnostic Connector - Equivalent to ISO/DIS 15031-3: December 14, 2001", revised 2016-07 Type A or Type B vehicle connector shall not exceed six (6) feet.” since the majority of users prefer a wireless connection between the DAD and the computer (based on current DAD sales), BAR is no longer requiring a hard wired connection between the DAD and OIS computer (Original DAD specification requirement 3.2.64 removed); therefore, it is only necessary to specify a cable length between the DAD and the vehicle. A specific cable length is necessary to allow a practical usability length to plug into the vehicle (based on currently sold equipment) and to ensure excessive length is not used that would ‘hide’ the DAD during fraudulent use, and to limit electrical interference and data loss due to excessive cable length.

Section 3.2.65: Even though it appears that this requirement is out of order due to the numbering, it is discussed here as this is where it appears in the underline and strike- out version of the updated DAD specification. This was the requirement number in the original DAD specification. The requirement has been removed. “The BAR Certified DAD Vendor may optionally offer various cable lengths (original fifteen feet (15’) cable must still be provided) between the SAE J1962 Type A or Type B vehicle connector and the BAR OIS Computer. All optional cable lengths shall be subject to, and must meet, all the Functional Validation Tests.” This change was necessary as it was overly complicated and is now unnecessary given the changes to the other cabling requirements.

Identification

This DAD specification section explains to the DAD Vendors the requirements related to identifying the DAD both physically from the outside as well as electronically through the Cal-VIS software. This is important from a data control point of view, knowing which DAD collected the data, as well as a compliance point of view, BAR personnel identifying if a DAD is allowed to be used in the vehicle inspections.

Section 3.2.52: The words “an” and “label” were removed to allow the DAD Vendors options in how to externally mark the DAD. This moves the requirement back to a performance standard rather than the less-desirable prescriptive standard to meet the regulatory goal of external identification.

Section 3.2.52.1: This requirement was reworded from “The DAD hardware/firmware shall be equipped with a unique, sequential, electronic serial number” to “The DAD external serial number shall be readable when the DAD is used to perform vehicle inspections. The “hardware/firmware…equipped with an electronic serial number” wording was removed as it is redundant to the later requirement “3.2.55 Each DAD shall include a unique, sequential, electronic serial number at the hardware level that is unique to the DAD.” A human readable serial number on the DAD is necessary to verify a BAR certified piece of equipment is purchased before being inspected by BAR to begin performing vehicle inspections or during BAR audit to ensure continued compliance.

Section 3.2.52.1.1: The new requirement “If a label needs to be replaced the DAD Vendor shall replace the label.” was added because under the original DAD specification, it was unclear if a label could be replaced and if so, by whom. This requirement addresses that issue. The change is being made this way because BAR does not want a third party to replace the label. The third party is not bound by this DAD specification. Only the DAD Vendor is bound by this DAD specification.

Section 3.2.52.1.1.1: The new requirement “The replacement label shall be the same type and appearance label affixed to the DAD submitted for certification.” was added because under the original DAD specification, labels were being generated and affixed to DADs by unknown parties. The BAR was unable to determine if the labels were correct for the DAD. Improper labeling raises suspicion of device tampering. This requirement addresses that issue. The change is being made this way because the DAD Vendor created and has access to the original labels.

Section 3.2.53: The new requirement “The DAD serial number shall not match any other device made by the DAD Vendor, even if the other device is not used in California’s vehicle inspection programs.” was added because DAD Vendors have begun producing DADs for different vehicle emissions programs. This requirement will ensure that only BAR certified DADs are used in the California programs. The change is being made this way because it can be confusing to BAR personnel when determining if the DAD is allowed to be used in the California programs.

Section 3.2.57: The word “electronic” was removed because the serial number in both forms, electronic and external, must comply with the format. The requirement as written limited the applicability. The words “assigned by BAR” were added to give BAR control of what the serial number prefix will be. This will eliminate possible conflict between DAD Vendors.

Section 3.2.57.1: The new requirement “For each DAD Vendor, the two alpha character serial number prefix shall be different for each DAD hardware revision.” was added because a single DAD Vendor can have multiple generations of DADs deployed. Without this requirement, it would be difficult for BAR to determine which generation the DAD belonged to. The change is being made this way because it allows BAR to differentiate the different DAD generations.

Section 3.2.58: The new requirement “The DAD Vendor shall set the metadata on the DLL files.” was added so BAR can determine which DAD Vendor has provided the files. Without this requirement, if would be difficult for BAR to determine which DAD Vendor provided the files. The change is being made this way because the DAD Vendor is the entity with control of what the metadata values are set to.

Section 3.2.58.1: The new requirement “The metadata shall include: ‘file version’, ‘assembly version’, ‘description’, ‘company name’ and ‘product name’.” was added because this is the identifying information that BAR requires to know the source of the files. The change is being made this way because this is the minimum amount of metadata needed for BAR to differentiate the DLL files.

Section 3.2.59: The new requirement “The DAD Vendor shall sign all DLLs and binary files.” was added because BAR is preventing nefarious individuals from replacing the files without BAR becoming aware of the replacement. The change was made this way because if nefarious individuals replace the files, the vehicle inspection data could be altered.

Section 3.2.59.1: The new requirement “The certificate used for signing shall be from a trusted Microsoft Windows authority.” was added because BAR must be able to trust that the signing is from a known source. The change was made this way because this is the industry standard.

Durability

This DAD specification section explains to the DAD Vendors how durable the DAD must be to withstand the automotive repair environment.

Section 3.2.73: Even though it appears that this requirement is out of order due to the numbering, it is discussed here as this is where it appears in the underline and strike- out version of the updated DAD specification. The original requirement “The DAD’s J1962 Type A or Type B connector, which includes, the housing, pins, wiring, and strain reliefs shall remain functional under the following condition for a total of five thousand (5,000) cycles (1 cycle = 1 connection + 1 disconnection): mating of the connectors with a ten degrees (10°) +/- two degrees (2°) offset between centerlines of each, keeping two (2) surfaces parallel” has been removed because BAR was not able to build a robot to test this requirement. The change was made this way because it relieves the DAD Vendors of possible needless expense.

Section 3.2.74: Even though it appears that this requirement is out of order due to the numbering, it is discussed here as this is where it appears in the underline and strike- out version of the updated DAD specification. The original requirement “The DAD’s connectors, which include, the housing, pins, wiring, and strain reliefs shall remain functional under the following condition for a total of five thousand (5,000) cycles (1 cycle = 1 connection + 1 disconnection): disconnection, by pulling the cable with a twenty pound (20 lb.) force offset of the mating connector by twenty degrees (20°) +/- four degrees (4°)” has been removed because BAR was not able to build a robot to test this requirement. The change was made this way because it relieves the DAD Vendors of possible needless expense.

Section 3.2.60: The word “The” was replaced with “Configured with cables connected and loosely coiled, the” because BAR was questioned by DAD Vendors on how the DAD would be configured during the drop test. The change clarifies the cables will be connected and loosely coiled. This was a point of confusion for the DAD Vendors.

Connectors

This DAD specification section explains to the DAD Vendors the physical traits the connectors shall have.

Section 3.2.61: The words “April 2002” were replaced with the words “201607, "Diagnostic Connector - Equivalent to ISO/DIS 15031-3: December 14, 2001", revised 2016-07”. This was done because providing the actual full name of the specification removes any confusion regarding which specification is being referenced. This is a newer version of the SAE specification being referenced. The underlying requirements have not changed. Version 201607 was updated in response to a request from CARB to SAE for clarification regarding the access area to the vehicle diagnostic connector that is intended to provide proper clearance for the mating of the scan tool connector to the vehicle. Clearance around the diagnostic connector affects the vehicle manufacturers and not DAD Vendors.

Section 3.2.63: The reference to EN 22768-1:1993 has been removed. This was done because there were two equivalent specifications referenced. Removing the unnecessary reference makes the requirement more concise. In addition, the full name of the ISO 2768-1 specification has been added. Providing the actual full name of the specification removes any confusion regarding which specification is being referenced. Finally, the words “revised APR2002” were replaced with the words “201607, "Diagnostic Connector - Equivalent to ISO/DIS 15031-3: December 14, 2001", revised 2016-07”. This was done because providing the actual full name of the specification removes any confusion regarding which specification is being referenced. This is a newer version of the SAE specification being referenced. The underlying requirements have not changed. Version 201607 was updated in response to a request from CARB to SAE for clarification regarding the access area to the vehicle diagnostic connector that is intended to provide proper clearance for the mating of the scan tool connector to the vehicle. Clearance around the diagnostic connector affects the vehicle manufacturers and not DAD Vendors.

Section 3.2.79: Even though it appears that this requirement is out of order due to the numbering, it is discussed here as this is where it appears in the underline and strike- out version of the updated DAD specification. The original requirement “For hardwired DAD devices, the connector between the DAD and the BAR OIS Computer shall be USB 2.0” has been removed because the DAD Vendor is no longer required to provide a hardwired connection between the DAD and the OIS computer. The original hardwired requirement 3.1.7 was removed.

DAD Functionality Check

This DAD specification section explains to the DAD Vendors all the different DAD subsystems that must be checked and be working properly during a vehicle inspection. If a subsystem was not checked or was not working properly during a vehicle inspection, a failing vehicle may be improperly passed, resulting in excess vehicle pollution being produced. The Cal-VIS software explicitly asks the DAD for the DAD functionality check results during a DAD self-test.

Section 3.2.64: The phrase “Smog Check Inspection” was replaced with “vehicle inspection. This was done since the DADs built to the updated DAD specification will be used in both BAR’s Smog Check Program and BAR’s Vehicle Safety Systems Inspection Program. The word “vehicle” was added before the word “inspection”. This was done to provide consistency and reduce confusion.

Section 3.2.64.1: The phrase “201607, "Diagnostic Connector - Equivalent to ISO/DIS 15031-3: December 14, 2001", revised 2016-07" was added after “SAE J1962”. This was done because providing the actual full name of the specification removes any confusion regarding which specification is being referenced.

Section 3.2.64.1.1: The new requirement “The mechanism shall verify the DAD’s ability to communicate with the vehicle on every required protocol.” was added to clarify what is included in the DAD functionality check. This ensures consistency between all DAD Vendors. The change is being made this way because verifying the DAD functionality helps to find when communication problems are the result of broken vehicles and not broken DADs.

Section 3.2.64.2: The new requirement “The mechanism shall verify the integrity of the ADS.” was added to clarify what is included in the DAD functionality check. This ensures consistency between all DAD Vendors. The change is being made this way because verifying the DAD functionality helps to find when ADS data problems are the result of broken vehicles and not broken DADs.

Section 3.2.64.3: The new requirement “The mechanism shall verify the integrity of the GNSS Receiver.” was added to clarify what is included in the DAD functionality check. This ensures consistency between all DAD Vendors. The change is being made this way because verifying the GNSS Receiver functionality helps to ensure that the vehicle inspection is occurring in a licensed vehicle inspection station.

Section 3.2.64.3.1: The new requirement “The mechanism shall verify communication from the GNSS Receiver.” was added to clarify what is included in the DAD functionality check. This ensures consistency between all DAD Vendors. The change is being made this way because verifying the GNSS Receiver functionality helps to ensure that the vehicle inspection is occurring in a licensed vehicle inspection station.

Section 3.2.64.3.2: The new requirement “The mechanism shall verify data downloaded from the GNSS Receiver.” was added to clarify what is included in the DAD functionality check. This ensures consistency between all DAD Vendors. The change is being made this way because verifying the GNSS Receiver functionality helps to ensure that the vehicle inspection is occurring in a licensed vehicle inspection station.

Section 3.2.64.4: The new requirement “The mechanism shall verify the resistance check functionality and include the entire DAD to vehicle cable including the DAD’s J1962 201607, "Diagnostic Connector - Equivalent to ISO/DIS 15031-3: December 14, 2001", revised 2016-07 connector.” was added to clarify what components of the DAD are included in the DAD functionality check. This ensures consistency between all DAD Vendors. The change is being made this way because including all DAD components in the resistance pathway during the DAD functionality check ensures that the resistance measurement is accurate when taken during a vehicle inspection.

Section 3.2.64.5: The word “vehicle” was added before the word “inspection”. This was done to provide consistency and reduce confusion.

Section 3.2.64.6: The new requirement “The DAD shall have a tamper detection mechanism.” was added because BAR is preventing nefarious individuals from accessing the internals of the DAD and possibly falsifying vehicle inspection data. The change is being made this way because false data can allow a failing vehicle to pass the vehicle inspection and could cause harm to an unsuspecting consumer who may purchase a vehicle that is broken and expensive to bring into compliance with the Program.

Section 3.2.64.6.1: The new requirement “The tamper detection mechanism shall indicate to the Cal-VIS software a tampered status when access to the DAD internal physical components was attempted by an unauthorized party.” was added because BAR requires a reporting mechanism to indicate the attempt to modify internal DAD circuitry that could manipulate failing vehicle inspection data to passing vehicle inspection data. The change is being made this way because BAR will be alerted, and BAR will be able to track down possible nefarious individuals attempting to manipulate the DAD hardware. In addition, the tamper detection mechanism is placed within the DAD functionality check because this is where all the checks to assess the DAD functionality are done. With a single request, the Cal-VIS software can obtain the status of all the DAD’s functionality including the ability to communicate on all protocols, the ADS status, the GNSS status and the tamper status. BAR does not specify how the individual mechanisms work, but leaves the actual technology used by DAD Vendors open to their design.

Section 3.2.64.6.2: The new requirement “The tamper detection mechanism shall indicate to the Cal-VIS software a tampered status when reading of the DAD firmware was attempted by an unauthorized party.” was added because BAR requires a reporting mechanism to indicate the attempt to read the DAD firmware that could lead to the ability to manipulate failing vehicle inspection data to passing vehicle inspection data.

This change is being made this way because BAR will be alerted, and BAR will be able to track down possible nefarious individuals attempting to manipulate the DAD firmware. In addition, the tamper detection mechanism is placed within the DAD functionality check because this is where all the checks to assess the DAD functionality are done.

With a single request, the Cal-VIS software can obtain the status of all the DAD’s functionality including the ability to communicate on all protocols, the ADS status, the GNSS status and the tamper status. BAR does not specify how the individual mechanisms work, but leaves the actual technology used by DAD Vendors open to their design.

Section 3.2.64.6.3: The new requirement “The tamper detection mechanism shall store the tamper status in a manner that cannot be erased by removing power (also known as non-volatile memory) located within the DAD housing.” was added because BAR requires a recording mechanism that cannot be erased by removing power. This change is being made this way because the mechanism will report the tamper even if the DAD has had the power removed. This is necessary based on BAR’s experience with other vehicle inspection equipment tamper detection mechanisms being bypassed by stations.

Section 3.2.64.6.4: The new requirement “When the DAD’s main battery is fully discharged, and the DAD is not powered externally, the mechanism shall set a tampered status when a tamper is done.” was added because BAR requires a reporting mechanism that cannot be bypassed. This change is being made this way because the mechanism will report the tamper even if the DAD has had the power removed or depleted.

Section 3.2.64.6.5: The new requirement “Once a tamper has been detected, the mechanism shall only indicate to the Cal-VIS software a clear tamper status after the DAD has been inspected and quality control checks have been successfully completed by the DAD Vendor at the DAD Vendor’s facility.” was added because BAR requires a reporting mechanism to indicate that the DAD is good to be used again. The change is being made this way because only properly working DADs can be used in the vehicle inspections. When tampered, inspection equipment fails to meet certified equipment requirement per CCR 3340.17(b).

Section 3.2.64.6.6: The new requirement “Once a tamper has been detected, the DAD shall be unusable for a vehicle inspection.” was added because a tampered DAD could be used to falsify vehicle inspection data. This change is being made this way because only properly working DADs can be used in vehicle inspections. When tampered, vehicle inspection equipment fails to meet certified equipment requirement per CCR 3340.17(b).

Section 3.2.64.6.6.1: The new requirement “If a tamper has been detected and not cleared, all Cal-VIS software calls to the DAD for OBD data or vehicle communications shall return an error for “Tampered”.” was added because BAR requires a reporting mechanism to indicate the tamper. This change is being made this way because only properly working DADs can be used in vehicle inspections.

Section 3.2.67: The new requirement “The DAD Vendor shall report to BAR within 48 hours the DADs that have been returned to them as tampered along with the details.” was added because BAR wants to know how prevalent attempted tampering is. The change is being made this way because each DAD Vendor services their own equipment and are the only ones with access to this information and can identify the details of the tampering. The possibility of fraud occurring needs to be dealt with swiftly. In addition, if there is a problem with the DADs, that would require an update, this immediate reporting allows a fix to be implemented quickly with BAR’s emergency or quarterly DAD update frequency as well as BAR’s corresponding Cal-VIS software quarterly update.

Section 3.2.68: The new requirement “If the DAD Vendor wishes to return the broken or tampered DAD to service, the DAD Vendor must repair the DAD including all indications of physical damage and inform BAR they wish to have the DAD unlocked.” was added because BAR does not want to mistake this DAD as tampered in the future if it has already been repaired and returned to service. In addition, BAR desires to be notified when a previously tampered DAD is being returned to service. The change is being made this way because BAR needs to prevent tampered DADs from returning to service before they are repaired.

Section 3.2.68.1: The new requirement “A broken or tampered DAD shall not be repaired in the field.” was added because BAR needs to be assured that all quality checks performed during original manufacturing are repeated after repair. The DAD Vendors are responsible for the DAD and not the service personnel who may be employed by a different company. The DAD must return to the physical facility because this is where the knowledge, tools, and ability exist to properly repair this sensitive area of the DAD. The field service representatives do not possess the knowledge, tools, or ability as they only swap out equipment when broken. DADs are manufactured by the DAD Vendor and not by a different company that replaces them when broken. The change is being made this way because the DAD Vendors have the proper knowledge and tools to perform proper internal DAD service. Requiring service in house ensures greater oversight and quality control than allowing field personnel to make field repairs. DAD

Vendors are responsible for proper DAD repair as they are the parties certified by BAR to perform such per the DAD specification incorporated by reference to California Code of Regulations. If DAD were to be repaired improperly BAR does not have the authority to penalize (e.g., decertify) vendors performing field repair, unlike the DAD Vendors who build the DADs, nor does BAR wish to complicate vendor certifications by amending regulation to include various certifications for various vendor roles. BAR also needs to immediately know about DAD tampers to take appropriate enforcement action.

DAD General Electrical

This DAD specification section explains to the DAD Vendors the how the DAD shall work electrically -- What power must be presented and what to do in case power is not available.

Section 3.2.69: The phrase “200204, “OBD II Scan Tool - Equivalent to ISO/DIS 15031- 4: December 14, 2001”, revised 2002-04” was added to the title of the SAE specification. This was done because providing the actual full name of the specification removes any confusion regarding which specification is being referenced.

Section 3.2.70: The new requirement “The DAD shall contain a battery capable of powering the DAD for a minimum of ten (10) minutes while trying to obtain a GNSS fix.” was added because the GNSS receiver requires power to obtain a signal. This change is being made this way because batteries are an inexpensive and reliable energy source and to prevent use of hardwired power that may not reach to an outdoor location where a GNSS signal may need to be obtained. Ten minutes is a reasonable amount of time to walk outside to get a GNSS signal if no signal is available inside the building.

Section 3.2.71: The word “sixteen (16)” was replaced with the word “-16” to standardize the format of the document when referring to the DLC pins.

Section 3.2.71.1: The word “sixteen (16)” was replaced with the word “-16” to standardize the format of the document when referring to the DLC pins.

Section 3.2.71.2: The word “sixteen (16)” was replaced with the word “-16” to standardize the format of the document when referring to the DLC pins.

Section 3.2.71.4: The word “must” was replaced with the word “shall”. There is no discernable difference between how ‘shall’ and ‘must’ are interpreted by BAR. This change was necessary to standardize the language used in BAR regulations. The phrase “201607, "Diagnostic Connector - Equivalent to ISO/DIS 15031-3: December 14, 2001", revised 2016-07” was added to the title of the SAE specification. This was done because providing the actual full name of the specification removes any confusion regarding which specification is being referenced.

Section 3.2.85: Even though it appears that this requirement is out of order due to the numbering, it is discussed here as this is where it appears in the underline and strike- out version of the updated DAD specification. The original requirement “The DAD shall not require pin four (4) (chassis ground) to be connected to ground in order to communicate with the vehicle” has been removed because there was confusion from the DAD Vendors on which DLC pins shall be used for ground. The DAD specification now clarifies that pin-5 is to be used. This change is being made this way to provide standardization between DAD Vendors.

Section 3.2.85.1: Even though it appears that this requirement is out of order due to the numbering, it is discussed here as this is where it appears in the underline and strike- out version of the updated DAD specification. The original requirement “The DAD may use pin four (4) if it is present but shall not require it to be present” has been removed because there was confusion from DAD Vendors on which DLC pins shall be used for ground. The DAD specification now clarifies pin-5 is to be used. This change is being made this way to provide standardization between DAD Vendors.

Section 3.2.85.2: Even though it appears that this requirement is out of order due to the numbering, it is discussed here as this is where it appears in the underline and strike- out version of the updated DAD specification. The original requirement “If ground is not present on pin four (4), the DAD shall be supplied with an alternate means of grounding” has been removed because there was confusion from DAD Vendors on which DLC pins shall be used for ground. The DAD specification now clarifies pin-5 is to be used. This change is being made this way to provide standardization between DAD Vendors.

Section 3.2.72: The word “five (5)” was replaced with the word “-5” in two places to standardize the format of the document when referring to the DLC pins.

Section 3.2.72.1: The new requirement “If ground is not present on pin-5, the DAD shall be supplied with an alternate means of grounding.” was added as the DAD specification has clarified pin-5 shall be used for ground. This requirement clarifies what should occur if pin-5 is not available as ground. This change is being made this way to provide standardization between DAD Vendors.

Removal of the title “Future OBD Data”: The title “Future OBD Data” was removed. This change was necessary because the requirement following this title was removed.

Section 3.2.89: Even though it appears that this requirement is out of order due to the numbering, it is discussed here as this is where it appears in the underline and strike- out version of the updated DAD specification. The following language has been removed: “For the ISO 15765-4 CAN protocol only, the DAD shall be capable of receiving a specific data request(s) from the NWA in the form of a Mode $xx PID $xx request message, be able to successfully format and transmit that message to the vehicle, retrieve the response from the vehicle, and provide the response to the BAR NWA (e.g., to allow capture of future data that is not included in the data files and/or defined by SAE yet). Such request messages will be restricted to SAE J1979 defined messages (i.e., Modes $01 through $0F including messages or data not currently identified in this DAD specification and/or after being defined by SAE J1979 at a future time).” This change was necessary because this requirement is now covered by the UDS requirements and is no longer valid.

X. Section 4: Functional Validation Tests

This DAD specification section explains to the DAD Vendors the different tests that BAR will perform in the certification testing of the DAD.

Wording following Section 4: Function Validation Tests: The words “The following” were replaced with “This section” and the words “includes requirements and” were added because in the original DAD specification, it was not clear that there were requirements in this section. The addition of these words clarifies there are requirements in this section.

Section 4.1: Testing

This DAD specification section explains to the DAD Vendors the different tests that BAR will perform in the certification testing of the DAD.

Section 4.1.4: The words “, (negative seven degrees (-7º) to fifty-five degrees (55º) Celsius (C))” were removed because the words added nothing to the requirement. In addition, all DAD testing by BAR is done in Fahrenheit.

Section 4.1.4.2: The words “twenty-four” and “24” were replaced with the words “thirty- two” and “32” as the previous voltage was too low. The DAD may see voltages up to thirty-two volts if it is used on a heavy-duty truck running a 24-volt electrical system. The word “Volts” and “Volt” were removed and replace with the abbreviation “V”. This was done as the abbreviation has previously been introduced. The abbreviation “V was moved outside of the parentheses. This was done as it is not standard to include the abbreviation inside parentheses.

The word “The word “sixteen (16)” was replaced with the word “-16” to standardize the format of the document when referring to the DLC pins.

The words “four (4) (chassis ground) and five (5)” have been replaced with the word “-5” because there was confusion from the DAD Vendors on which DLC pins shall be used for ground. The DAD specification now clarifies pin-5 is to be used. This change is being made this way to provide standardization between DAD Vendors. The words “external test” have been replaced with the word “diagnostic”. This was done as this is the wording used in the SAE specification that describes this connector.

Section 4.1.4.3: The words “twenty-four” and “24” were replaced with the words “thirty- two” and “32,” as the previous voltage was too low. The DAD may see voltages up to thirty-two volts if it is used on a heavy-duty truck running a 24-volt electrical system. The word “Volts” and “Volt” were removed and replace with the abbreviation “V”. This was done as the abbreviation has previously been introduced. The abbreviation “V was moved outside of the parentheses. This was done as it is not standard to include the abbreviation inside parentheses.

The word “The word “sixteen (16)” was replaced with the word “-16” to standardize the format of the document when referring to the DLC pins.

The words “four (4) (chassis ground) and five (5)” have been replaced with the word “-5” because there was confusion from the DAD Vendors on which DLC pins shall be used for ground. The DAD specification now clarifies pin-5 is to be used. This change is being made this way to provide standardization between DAD Vendors. The words “external test” have been replaced with the word “diagnostic”. This was done as this is the wording used in the SAE specification that describes this connector.

The words “(The DAD will not be powered on due to the reversed polarity)” were removed, as these words were not a requirement and were unnecessary.

Section 4.1.4.4: The word “Volts ()” was removed because the abbreviation “V” was previously introduced in the DAD specification and the extra word was redundant.

The word “Volt V” was removed because the abbreviation “V” was previously introduced in the DAD specification and the extra word was redundant.

The words “seven (7)” were replaced with the word “-7” to standardize the format of the document when referring to the DLC pins.

The words “fifteen (15)” were replaced with the word “pin-15” to standardize the format of the document when referring to the DLC pins.

The words “four (4) (chassis ground) and five (5)” were replaced with the word “-5” because there was confusion from the DAD Vendors on which DLC pins shall be used for ground. The DAD specification now clarifies pin-5 is to be used. This change is being made this way to provide standardization between DAD Vendors. The words “external test” have been replaced with the word “diagnostic”. This was done as this is the wording used in the SAE specification that describes this connector.

Section 4.1.4.8: The requirement “Connector cyclic testing: The J1962 Type A or Type B, OBD connector, which includes, the housing, pins, wiring, and strain reliefs shall remain functional (defined as the ability to successfully retrieve the OBD data, detailed in this specification, upon completion of the following test for a total of five thousand (5,000) cycles (1 cycle = 1 connection + 1 disconnection): Mating of the connectors with a ten degrees (10°) +/- two degrees (2°) offset between centerlines of each, keeping two (2) surfaces parallel” has been removed because BAR was not able build a robot to to test this requirement. The change was made this way because it relieves the DAD Vendors of possible needless expense.

Section 4.1.4.9: The requirement “Connector cyclic testing: The J1962 Type A or Type B, OBD connector, which includes, the housing, pins, wiring, and strain reliefs shall remain functional (defined as the ability to successfully retrieve the OBD data, detailed in this specification, upon completion of the following test for a total of five thousand (5,000) cycles (1 cycle = 1 connection + 1 disconnection): Disconnection, by pulling the cable with a twenty pound (20 lb.) force offset of the mating connector by twenty degrees (20°) +/- four degrees (4°)” was removed because BAR was not able to build a robot to test this requirement. The change was made this way because it relieves the DAD Vendors of possible needless expense.

Section 4.1.5: The word “PC” was replaced with the word “OIS computer” for consistency, as the word computer is used throughout the DAD specification, and this is the only instance of the word PC.

Section 4.1.12: The words “Alternating Current ()” were added for clarity, as the initialism AC did not have a definition.

Section 4.1.14: The original requirement “A connectivity rate, as required in this document, determined from DAD Vendor selected and BAR approved Beta Testing sites” has been removed because this section of the DAD specification details testing that BAR may conduct. The requirement is not appropriate and has been removed.

The new requirement “Satellite availability shall be determined by a BAR supplied GNSS device.” was added because this is the companion testing requirement for the requirement 3.1.24.1.2 that was previously added. The change is being made this way because those requirements that are

tested must have a standard to be tested against. This requirement provides that standard for the DAD GNSS capabilities.

Section 4.1.15: The original requirement “The DAD Vendor shall provide proof to BAR of successful testing of requirement 4.1.4.8” has been removed because the companion requirement 4.1.4.8 was removed. The removing of 4.1.4.8 made this requirement obsolete.

The new requirement “Proof of DAD operation without connecting to non-BAR approved internet sites shall be performed by restricting the Internet Protocol (IP) range that the Cal-VIS software may access.” is necessary because this is the companion testing requirement for the requirement 3.1.23 that was previously added. The change is being made this way because those requirements that are tested must have a standard to be tested against. This requirement provides that standard for the DAD conducting a vehicle inspection without connecting to non-BAR approved internet sites.

Section 4.1.16: The requirement “The DAD Vendor shall provide proof to BAR of successful testing of requirement 4.1.4.9” has been removed because the companion requirement 4.1.4.9 was removed. The removing of 4.1.4.9 made this requirement obsolete.

The new requirement “The DAD shall be presented with a pure sine wave with an amplitude of 5 V and a frequency of 500 kHz, on one of the DLC pins. The ADS shall be commanded to collect 500 msec of data on the DLC pin at 50 MS/s. This data shall be compared against a NIST traceable oscilloscope (BAR is currently using a Rigol DS6104 for certification) at 50 MS/s sampling the same waveform. The samples shall be within 1% of the samples taken by the "comparison scope".” has been added. This change was necessary because this is the companion testing requirement for the requirement 3.1.28 that was added. The change is being made this way because those requirements that are tested must have a standard to be tested against. This requirement provides that standard for the ADS requirement. Including this testing description helps DAD Vendors perform like testing prior to submitting to BAR for certification. In BAR’s experience it necessary to mandate the DAD achieve a specific level of performance bounded by the listed units, sample rate, and accuracy to ensure the ADS is capable of detecting fraud and providing BAR the necessary data to detect and prevent fraud.

XI. Section 5: Certification, Annual Recertification and Decertification/Citation

This DAD specification section explains to the DAD Vendors the procedural methodologies and requirements involved in the certification and annual recertification testing of the DAD. In addition, the Decertification or Citation process is discussed.

The words “the” and “Event” were added to the paragraph because the term Certification Testing was problematic and confusing to the stakeholders. The addition of these words clarifies that Certification Testing is an Event.

Section 5.1: Certification

This DAD specification section explains to the DAD Vendors the procedural methodologies and requirements involved in the certification of the DAD.

Section 5.1: Certification: The paragraphs in this top section were moved and updated from the section below 5.1.6 because there was no context for the requirements that follow. By moving the text to this area, context is provided. In addition, the concept of a “Certification Testing Event” had been introduced to clarify the meaning of “Certification”. The term “Certification” was vague, and this section has been updated to delineate each portion or the “Certification Testing Event”. The consistent use of terminology presents a clearer reading of the section and reduces confusion.

In the first paragraph the words “On a showing of interest by means of written requests to BAR from DAD Vendors,” and “Event no more than annually” were added to clarify under what circumstances BAR will conduct a Certification Testing Event. Since implementing the program, BAR has learned that there is not enough interest from new DAD Vendors to warrant a yearly event. The Certification Testing Event shall occur no more than annually because of limitations in staffing levels and test equipment.

In the first paragraph the word “will” was replaced with the word “shall”. This was done because in this portion of the DAD specification, BAR is using stronger language to commit to the DAD Vendors what BAR’s intentions are during the certification process.

In the first paragraph the words “at least on a yearly basis” were removed because since implementing the OIS vehicle inspection, BAR has learned that there is not enough interest from new DAD Vendors to warrant a yearly event.

In the first paragraph the words “collection periods” were replaced with the words “Certification Testing Events” because the term “collection period” was problematic and confusing to the stakeholders. The addition of this words clarifies that the DAD specification is detailing the Certification Testing Event.

The second paragraph was updated from “The BAR shall charge a fee for Certification Testing of the DAD.” to “BAR shall charge a Certification Testing Fee for each Certification Testing Event” because the term Certification Testing was problematic and confusing to the stakeholders. The additional words clarify the fee and that this is an Event. Fees are charged on an event basis and not for every certification test cycle.

The third paragraph was updated from “If multiple configurations are submitted (e.g. wireless) they will be included in this single Certification Fee.” to “If both a wired and wireless DAD configurations are submitted during the same Certification Testing Event, they will be tested for a single Certification Testing Fee.” This change was necessary because the term multiple configurations was vague. In addition, the paragraph clarified that the wired and wireless DAD must be submitted in the same Certification Testing Event to be tested for a single Certification Testing Fee.

In the fourth paragraph the word “Testing” was added. This was done to create “Certification Testing Fee”. This change creates parallel wording to “Certification Testing Event”. BAR believes that the parallel wording makes the section easier to read and comprehend. In addition, the words “the” and “Event” were added to the paragraph because the term Certification Testing was problematic and confusing to the stakeholders. The addition of these words clarifies that Certification Testing is an Event.

The word (2) was added to the Health and Safety Code. This was done to narrow the reference. This provides clarity to the reader when looking at the reference.

The fifth paragraph was removed because this information is already in HSC 44036(b) and having it here is redundant.

In the sixth paragraph the words “the” and “Event” were added to the paragraph because the term Certification Testing was problematic and confusing to the stakeholders. The addition of these words clarifies that Certification Testing is an Event. The phrase “for this round” was removed. Certification is no longer referred to in “rounds” but by the word “Event”. Removing this phase maintains consistency in wording.

Section 5.1.1.1: The words “the” and “Testing Event” have been added. This was done to use consistent wording. This change makes the section easier to read and comprehend.

Section 5.1.2: The new requirement “To apply for the Certification Testing Event, the DAD Vendor shall contact BAR at the contact information provided under Section 5.2 Annual Recertification located later in this document.” was added because the original DAD specification did not contain a requirement directing potential DAD Vendors to contact BAR. The change is being made this way because the only way for potential DAD Vendors to have their DAD certified is to contact BAR.

Section 5.1.3.1: The words “found in Appendix A” have been replaced with the words “which shall collect the following information: DAD Vendor name, DAD Vendor address, DAD Vendor phone number, DAD Vendor email address, DAD Vendor website, DAD make name or number, DAD model name or number, DAD hardware version, DAD firmware version, DAD software version, DAD serial numbers, DAD Vendor supplied computer model and serial number. In addition, if applicable: partnering company(ies) name, partnering company(ies) address, partnering company(ies) phone number, partnering company(ies) email address, partnering company(ies) website, and partnering company(s) role(s). Certification that the undersigned hereby certifies, to the best of his/her knowledge, that the above equipment submitted for testing and evaluation has been designed and tested in accordance with the California Vehicle Inspection System Data Acquisition Device Specification, and all subsequent addenda, and that they meet all of the requirements contained therein. The signature of the person representing the DAD Vendor. The date the Application for Certification form was signed.” because BAR has removed the physical form from Appendix A and placed the information that was collected on the form from Appendix A into this requirement.

This was done so that the Certification Submittal Package physical or electronic form can be changed without the need for regulatory change. The addition of the words “if applicable: partnering company(ies) name, partnering company(ies) address, partnering company(ies) phone number, partnering company(ies) email address, partnering company(ies) website, and partnering company(s) role(s).” was done because BAR’s experience administrating the current DAD specification has proven that although the DAD Vendor is responsible for meeting the requirements, they may depend on other companies to meet some of the requirements. Having the additional information allows BAR to completely understand which company is meeting which part of the DAD specification and allows BAR to reach out to these companies in addition to the DAD Vendor, when issues arise.

Section 5.1.3.4: The new requirement “To assist in the Certification Testing Event, the DAD Vendor shall supply BAR with the following: laptop computer with login credentials, DAD user guide with a description of the user interface, all end user documentation, DAD setup and operation instructions, all DAD related drivers, documentation showing installation of DAD drivers, latest version of the DAD firmware, latest version of the DAD software, documentation showing setup and use of the DAD software including DAD self-test, documentation showing the installation, removal, and downgrade of DAD drivers and software, photos of the DAD with all accessories, documentation of any known abnormal interaction with vehicles.” was added because these are the items typically sent to and used by BAR for the Certification Testing Event. The change is being made this way so that the DAD Vendors have a definitive listing of all items needed.

Section 5.1.5: The new requirement “The DAD Vendor shall submit one electronic copy of the Certification Submittal Package to BAR in portable document format (pdf).” was added because it informs the DAD Vendors of how to submit the Certification Submittal Package. The change is being made this way because it reduces the amount of paper that is transferred to and stored by BAR. PDF is a standard format and saving documents in this manner is often built-in to popular word processing programs at no additional cost.

Section 5.1.6: The words “the” and “Testing Event” were added around the word “Certification” because the term Certification by itself was problematic and confusing to the stakeholders. The addition of these words clarifies that Certification Testing is an Event and maintains the consistent word use. The word “Certification” was replaced with the words “DAD specification”. The Certification requirements are located within the DAD specification. The DAD must comply with all of the DAD specification requirements, not just the Certification requirements. This change clarifies BAR’s intent.

Text below Section 5.1.6: In the first three paragraphs, the language removed has been relocated to below Section 5.1 Certification because there was no context for the requirements that followed. By moving the text to this area, context is provided.

In the first paragraph, the word “Testing” was added. This was done to create “Certification Testing Fee”. This change creates parallel wording to “Certification Testing Event”. BAR believes that the parallel wording makes the section easier to read and comprehend. In addition, the phrase “rounds of testing” were replaced with the phrase “attempts in each phase”. This was done phrase was confusing. Focusing the message on “attempts” instead of “rounds” clarifies BAR intent.

In the fourth paragraph, the words “the”, “Event”, and “, Alpha Testing and Beta Testing” were added to the first sentence to clarify the sentence.

In the fourth paragraph, the “The DAD Vendor will have two attempts to pass each phase of testing.” This change was necessary to convey how the Certification Testing Event is conducted. Two attempts is based on BAR’s experience that all DAD Vendors needed at least one change to successfully pass the Certification Testing Event.

Section 5.1.7: The phrase “five (5)” was replaced with the phrase “ten (10)”. This was done given the increase complexity of the DADs built to the updated DAD specification. In order to complete the Certification Testing Event in a timely manner, BAR will need to test multiple DADs simultaneously in BAR’s lab environment. This simultaneous testing approach requires additional DADs.

Section 5.1.7.1: The new requirement “If the DAD Vendor is seeking certification for DADs with multiple connection means (i.e. wireless with different connection means (i.e. Wi-Fi. Bluetooth), wired with different connection means (i.e. Ethernet, USB)), the DAD Vendor shall provide BAR with five (5) DADs for each connection means.” was added because it communicates to the DAD Vendors how many DADs are to be supplied to BAR. The change is being made this way because BAR needs five DADs of each type to fulfil certification testing needs. Five DADs are required since two are used for vehicle communication testing, two are subjected to destructive testing, and one is a backup.

Section 5.1.8: The new requirement “All DADs and equipment supplied to BAR by the DAD Vendor shall become and remain the property of BAR, except as detailed below.” was added because the original DAD specification did not inform the DAD Vendors that the DADs and equipment supplied to BAR will remain at BAR. The change is being made this way because BAR will continue to test the DADs throughout the duration of the DAD certification period, as changes are implemented. The use of the DADs ensures that the number of problems encountered by the stations will be minimized.

Section 5.1.8.1: The new requirement “The DAD Vendor shall maintain all DADs and equipment supplied to BAR free of charge for the duration of the DAD Certification period of one year plus any recertification period.” was added because the original DAD specification did not inform the DAD Vendors that the DADs and equipment supplied to BAR will need to be maintained free of charge. The change is being made this way because as the DAD Vendors implement upgrades and/or fixes to problems, those same upgrades and/or fixes will need to be made to the DADs and equipment supplied to BAR so that BAR has an exact copy of equipment used in stations that can be certification tested. The duration includes both the initial one-year certification and subsequent annual recertification periods so there is no confusion that maintenance is mandatory continuously while the DAD is BAR certified or undergoing recertification.

The maintenance is included in this regulation instead of a separate contract agreement and must be at no cost to BAR as BAR does not have the resources to maintain several non-competitively bid service contracts. DAD Vendors are currently supporting BAR used DADs.

Section 5.1.8.1.1: The new requirement “The DAD Vendor shall complete maintenance within 72 hours of BAR call for service.” was added because the DAD Vendor must know how quickly the equipment is to be repaired. BAR uses these pieces of equipment to certify changes made to the equipment. If they are in disrepair, BAR cannot complete this critical work. BAR chose the 72-hour standard as this is what the BAR-97 EIS specification required and is a reasonable balance of DAD Vendor resources and downtime.

Section 5.1.8.1.2: The new requirement “The DAD Vendor shall visit BAR in person to perform maintenance if not possible remotely.” was added to inform the DAD Vendor that remote assistance is allowed and if the maintenance cannot be performed, the DAD Vendor must perform the maintenance in person. As mentioned above, BAR requires this equipment to be functioning properly to conduct certification testing of the equipment.

Text below Section 5.1.9: In the first paragraph, the words “This testing” have been replaced with the words “The Alpha Testing” because the wording clarifies how the Certification Testing Event proceeds by using different terms to describe the different phases of testing. The word “Specification has been replaced with the phrase “DAD specification”. This was done to clarify which specification is being referenced.

In the second paragraph, the word “testing” has been replaced with the words “Alpha Testing” because the wording clarifies how the Certification Testing Event proceeds by clearly indicating which phase of testing the language applies to.

In the second paragraph, the words “on all DADs submitted during the two (2) week collection period;” have been removed because the wording is redundant to two-week collection period requirement in section 5.1.

In the second paragraph, the word “each” was replaced with the word “the” because the DAD Vendor receives their own certification testing results. All DAD Vendors do not receive results of their competitors.

In the second paragraph, the words “all testing during” were removed to improve readability as passing ‘all testing during’ is the same as passing Alpha Testing.

In the second paragraph, the word “move” was replaced with the word “proceed” because the wording clarifies how the Certification Testing Event proceeds, because the DAD does not physically move to the next phase of Beta Testing, the word “proceed” better communicates that the model of DAD is allowed by BAR to be used in the subsequent step for Beta Testing in stations.

In the second paragraph, the words “the second phase” have been replaced with the words “Beta Testing” because the wording clarifies how the Certification Testing Event proceeds. The term ‘Beta Testing’ predates the changes in this proposal, as demonstrated by the use of the term in the fifth paragraph of the text preceding 5.1.10.

In the second paragraph, the words “does not pass” were replaced with the words “fails the first attempt of” because with two attempts allowed at Alpha testing, the phrase ‘does not pass’ is inappropriate as it refers to failing the whole Alpha phase and not just the first of two attempts which BAR is clarifying with the change.

In the second paragraph, the words “and shall not be eligible for additional testing in the current round” were removed because BAR is changing to allow a second attempt within 90 days. A second attempt is necessary based on prior experience where all DAD Vendors needed at least one correction to pass testing. Allowing one correction is necessary to achieve expedient equipment certification with reasonable retesting effort.

In the second paragraph, the words “submitted during the next collection period” have been replaced with the words “resubmitted for a second attempt of Alpha Testing within 90 days from the date of failure” because BAR is changing to allow a second attempt within the initial Alpha Testing phase. A second attempt is necessary based on prior experience where all DAD Vendors needed at least one correction to pass testing.

Allowing one correction is necessary to achieve expedient equipment certification with reasonable retesting effort.

In the second paragraph, the word “submitted” was replaced with the word “resubmitted” because the wording clarifies how the Certification Testing Event proceeds, as the term ‘submitted’ may be construed as meaning an initial submittal, rather than a resubmittal.

In the second paragraph, the word “time” was replaced with the words “attempt of Alpha Testing,” because the wording clarifies how the Certification Testing Event proceeds, as the phrase “attempt of Alpha Testing” is more specific to the purpose of resubmittal than the more general term ‘time.’

In the second paragraph, the words “the revised DADs along with” were added because there would be nothing to test if the equipment were not resubmitted to BAR after corrections were made by the DAD Vendor to address prior defect. In the second paragraph, the word “Testing” was added for terminology consistency to match the “Certification Testing Fee” language in section 5.1.

In the third paragraph, the words “does not pass” were replaced with the word “fails” because the wording clarifies how the Certification Testing Event proceeds, because the term “does not pass” provides improved audience comprehension as it is easier to understand fail vs. does not pass.

In the third paragraph, the words “has failed the Certification Testing Event and” were added because the wording clarifies how the Certification Testing Event proceeds as mentioned in the first paragraph following section 5.1.6 giving the DAD Vendor two attempts to pass each phase of testing.

In the third paragraph, the word “round” was replaced with the words “Certification Testing Event” because the wording clarifies how the Certification Testing Event proceeds as introduced as an Event in section 5.1.

In the fourth paragraph, the phrase “Certification Testing Event” have been added to clarify the collection period. In addition, the word “Testing” was added. This was done to create “Certification Testing Fee”. This change creates parallel wording to “Certification Testing Event”. BAR believes that the parallel wording makes the section easier to read and comprehend.

In the fifth paragraph, the uppercase “S” in the word and stations was replaced with the lowercase “s” as the word was improperly capitalized.

In the fifth paragraph, the words “BAR may require a minimum sample size for each of the model year and fuel type groups covered under Connectivity Rate.” have been added to ensure the DADs undergoing certification experience a distribution of vehicles matching the whole fleet requiring OIS vehicle inspection. Some vehicles are rare and if skipped would expedite testing, to

the disadvantage of certification. This minimizes risk of the certified DAD failing to communicate with vehicles and allows BAR to assess connectivity rate in each vehicle group listed in the Connectivity Rate section.

The sixth paragraph was added: “The DADs shall meet the Connectivity Rate in order to pass Beta Testing.” This change was necessary to clarify that Beta Testing is when BAR is initially evaluating Connectivity Rate since the Connectivity rate section only requires DAD Vendors maintain connectivity rate, which could be misunderstood as only applying after a DAD is certified.

The seventh paragraph was added: “BAR will begin counting test records upon activation of all required DADs in each Beta Testing step (Sacramento Region Testing and Statewide Testing).” This change was necessary so DAD Vendors will not lag on deploying the required quantity of DADs before starting data collection.

Section 5.1.10: The uppercase “S” in the word and stations was replaced with the lowercase “s” as the word was improperly capitalized. In addition, this requirement was split into two requirements. The second requirement is 5.1.11.1.

Section 5.1.11: The new requirement “The DAD Vendor shall email BAR the chosen Smog Check Stations”. Was added because the new requirement clarifies the process that is followed during the Certification Testing Event. The change is being made this way because BAR needs to track where the vehicle inspections are being conducted to determine if the DAD specification is being met.

Section 5.1.11.1: This existing second requirement from 5.1.10 was broken out into its own number because the original DAD specification had two requirements under a single requirement number. In addition, the sentence “BAR’s approval is based on the Smog Check Station following vehicle inspection procedures as specified in the Smog Check Manual.” was added to clarify BAR’s approval process.

Section 5.1.11.2: The new requirement “BAR may remove Smog Check Stations from Beta status if they fail to follow vehicle inspection procedures as specified in the Smog Check Manual.” was added to advise DAD Vendors that they may need to choose alternate stations if BAR determines that the station is not following vehicle inspection procedures. The change is being made this way because it allows BAR to maintain a high volume and quality level of testing during the infield portion of the Certification Testing Event.

Section 5.1.12: The word “field” was replaced with the words “BAR approved Smog Check Stations” because the additional words reinforce the requirement that the DADs are only to be deployed to BAR approved Smog Check Stations.

Section 5.1.12.1: The new requirement “For the Sacramento Region collection of the first one thousand five hundred (1,500) test records, the DAD Vendor shall collect an equal number of test records by each of the available DAD connection means (wired and wireless if both have been submitted to BAR).” was added because under the original DAD specification, there was no delineation on how the test records were to be distributed by connection means. The change is being made this way because it allows BAR to verify with a valid sample size (1,500 test records is the current existing requirement) that the DAD can communicate using all offered connection means. An ‘equal number’ means that if there are two connection means, then the 1,500 would be

divided by two, so 750 samples per each means. Since the DAD specification permits DAD Vendors to choose the DAD to computer connection technology (e.g., USB, WiFi, Bluetooth, etc). there is a potential, as seen with current DADs, that a DAD can support multiple connection means, so all need to be tested for proper operation during certification.

Section 5.1.12.1.1: The new requirement “If the wired DAD submitted can be connected by multiple means (i.e. Ethernet and USB), the DAD Vendor shall collect an equal number of test records by each of the wired connection means.” was added because under the original DAD specification, there was no delineation on how the test records were to be distributed by connection means. The change is being made this way because it allows BAR to verify that the DAD can communicate using all offered connection means.

Section 5.1.12.1.2: The new requirement “If the wireless DAD submitted can be connected by multiple means (i.e. Wi-Fi and Bluetooth), the DAD Vendor shall collect an equal number of test records by each of the wireless connection means.” Was added because under the original DAD specification, there was no delineation on how the test records were to be distributed by connection means. The change is being made this way because it allows BAR to verify that the DAD can communicate using all offered connection means.

Section 5.1.13.1: The new requirement “For the Statewide Testing, the DAD Vendor shall collect an equal number of test records by each of the available DAD connection means (wired and wireless if both have been submitted to BAR).” was added because under the original DAD specification, there was no delineation on how the test records were to be distributed by connection means. The change is being made this way because it allows BAR to verify that the DAD can communicate using all offered connection means.

Section 5.1.13.1.1: The new requirement “If the wired DAD submitted can be connected by multiple means (i.e. Ethernet and USB), the DAD Vendor shall collect an equal number of test records by each of the wired connection means.” was added because under the original DAD specification there was no delineation on how the test records were to be distributed by connection means. The change is being made this way because it allows BAR to verify that the DAD can communicate using all offered connection means.

Section 5.1.13.1.2: The new requirement “If the wireless DAD submitted can be connected by multiple means (i.e. Wi-Fi and Bluetooth), the DAD Vendor shall collect an equal number of test records by each of the wireless connection means.” was added because under the original DAD specification, there was no delineation on how the test records were to be distributed by connection means. The change is being made this way because it allows BAR to verify that the DAD can communicate using all offered connection means.

Text below Section 5.1.13.1.2: The words “Any number of Beta Testing stations above the minimum may or may not be approved by BAR.” were replaced with “BAR may approve the use of additional DADs above the minimum for use during Beta Testing.” because under the original DAD specification, the focus was on the number of stations and not on the number of DAD deployed. This change allows multiple DADs to be used in a single station as is common practice. This is

necessary since it may be difficult for DAD Vendors to find stations willing to participate in Beta testing since it typically involves using both the EIS and OIS vehicle inspection equipment to evaluate connectivity rate on 1996 to 1999 model year vehicles and while not in Beta, stations only use an EIS to inspect these older vehicles. The words “the DAD fails the first attempt at” were added. This change was necessary because under the original DAD specification, it was not clear that the DAD could fail at this point.

In two places, the word “Specification has been replaced with the phrase “DAD specification”. This was done to clarify which specification is being referenced.

The phrase “the DAD fails the first attempt at” were added. This was done to clarify the process of the Certification Testing Event.

The words “of that Vendor’s DADs will stop, the BAR will request remedy of the deficiencies, and the Beta Testing period shall begin again for that Vendor’s DADs.” were replaced with “The failed DAD may have its deficiencies addressed and may be resubmitted for a second attempt of Beta Testing. If the failed DAD is resubmitted for a second attempt of Beta Testing, the DAD Vendor shall submit the revised DADs along with a new Certification Submittal Package, excluding the DAD Certification Testing Fee.” because under the original DAD specification, the process to be followed was not clear and lacked requirement capturing documentation of changes made to remedy deficiencies. The modifications to section five of the DAD specification are an attempt at providing a clearer understanding of how the certification process works. In the original DAD specification, inconsistent word use and non-concise wording made it hard for the DAD Vendors to understand the process. The change here is part of the larger attempt to provide clarity to the DAD Vendors.

Section 5.1.14: The word “Specification has been replaced with the phrase “DAD specification”. This was done to clarify which specification is being referenced.

Section 5.1.15: The new requirement “During Beta Testing, the DAD Vendor shall investigate and explain to BAR all Smog Check Inspections with an Inspection Status other than ‘D’ (done) as identified in BAR provided Beta Testing summary reports.” was added to explicitly require the DAD Vendor to communicate the reason for unsuccessful Smog Check Inspections. The change is being made this way because the reason for the unsuccessful Smog Check Inspection may not be the fault of the DAD. For example, when a test result of AB is recorded for an abandoned test, BAR needs to know why it was abandoned in case it was abandoned due to a DAD issue that may prevent it from being certified, or maybe the inspector legitimately abandoned the test for a medical emergency.

Text following Section 5.1.15: This is a new paragraph: “If the DAD Vendor investigation yields that the problem with the Smog Check Inspection was due to a DAD issue, BAR may fail the DAD and require the DAD issue to be addressed before starting the second attempt of Beta Testing.” This change was necessary to communicate that incomplete Smog Check inspections (other than Done) may be added to Smog Check inspections that Fail for no communication and ultimately could cause the DAD to fail BAR certification. The requirement was written this way to put the burden on the DAD Vendor to provide BAR the basis for explanation. The change is being made this way because the DAD Vendor will be able to understand the reasons BAR may or may not fail the DAD.

Section 5.1.16: The new requirement “The DAD Vendor shall propose, and if accepted by BAR, implement a solution for all DAD issues prior to starting the second attempt of Beta Testing.” was added because the original DAD specification did not explicitly require the DAD Vendor to have a solution prior to continuing. The change is being made this way because BAR will evaluate if the solution is appropriate for the DAD issue. This requirement is needed so DAD Vendors tell BAR what they fixed and gives BAR the opportunity to review the fix prior to restarting Beta testing. Without understanding what and how something was fixed, BAR is less able to monitor for reoccurrence of the issue.

Text below Section 5.1.16: The first paragraph is new: “BAR will only count Smog Check Inspections with an Inspection Status of ‘D’ (done). This change was necessary because incomplete tests, those marked other than Done, may not include all portions of a full Smog Check inspection that are critical to determining whether or not the DAD meets all the requirements in this DAD specification as necessary to achieve BAR certification.

In the second paragraph the phrase “in accordance with the required minimum sample sizes for each of the model year and fuel type groups covered in the Connectivity Rate section of this DAD specification.” was added. This was done to clarify that a specific grouping of vehicles must be tested, in accordance with other requirements within this DAD specification.

In the third paragraph, the words “at the end of 4 months” were replaced with “within 120 calendar days of entering Beta Testing” because the number of days per month are varied and having a set number of days is more equitable for the DAD Vendors. In the third paragraph, the words “or be required to resubmint (sic) their DAD at the next collection period.” were removed because the wording clarifies how the Certification Testing Event proceeds.

In the third paragraph, the words “If BAR determines that the DAD Vendor will not be allowed to continue Beta Testing, the DAD has failed Beta Testing.” were added to clarify that if a DAD Vendor takes too long to complete Beta Testing, BAR will fail that DAD and the DAD Vendor must resubmit with new fees if that DAD Vendor wishes to try again. This clarification is necessary since BAR does not have unlimited resources to monitor a DAD Vendor’s certification attempt for an unlimited period.

In the fourth paragraph, the word “specification has been replaced with the phrase “DAD specification”. This was done to clarify which specification is being referenced.

In the fifth paragraph, the word “Specification has been replaced with the phrase “DAD specification”. This was done to clarify which specification is being referenced. In two places, the phrase “Smog Check Program” has been replaced with vehicle inspection programs”. This was done since the DADs built to the updated DAD specification will be used in both BAR’s Smog Check Program and BAR’s Vehicle Safety Systems Inspection Program.

The sixth paragraph “The failed DAD may have its deficiencies addressed and may be submitted during the next collection period. If the DAD is submitted that failed Beta Testing is submitted for a second time, the DAD Vendor shall submit a new Certification Submittal Package, excluding the DAD Certification Fee, if they had not previously failed Alpha Testing” has been removed because the paragraph was redundant with similar wording in the paragraph following section 5.1.13.

In the seventh paragraph, the word "vendor" was replaced with the phrase “DAD Vendor”. This was done to match the usage throughout the DAD specification. The word “round” was replaced with the words “Certification Testing Event” because this updates the language to use current terminology as established in earlier section 5.1.

In the seventh paragraph the words “The failed DAD may have its deficiencies addressed and may be submitted during the next collection period. If the failed DAD is submitted again, the DAD Vendor shall submit a new Certification Submittal Package, including the DAD Certification Fee.” were removed because the wording was redundant with wording in the fourth paragraph following section 5.1.9.

Section 5.2: Annual Recertification

This DAD specification section explains to the DAD Vendors the procedural methodologies and requirements involved in the annual recertification of the DAD.

Section 5.2.1: The new requirement “All DADs shall be recertified on their annual recertification date.” was added to inform DAD Vendors that BAR will base the annual renewal cycle on the date the original certification was issued and not group all recertifications together. The change is being made this way because the DAD Vendors have different recertification dates and this requirement ensures that BAR will not be resource constrained. Having the dates spread out allows the BAR Engineers performing the recertification testing to have a steady workload without having periods where all of the testing is due for all of the DAD Vendors. This is preferable to all DAD Vendors being recertified on the same date.

Section 5.2.2: A hyphen “-“ was added to the words “one year” making them “one-year” was necessary to align the document more closely with the Department of Consumer Affairs Style Guide, Revised August 2019.

Section 5.2.3: The words “submit the DAD for the annual recertification” were replaced with the words “correct the outstanding issues prior to submitting the Annual Recertification Submittal Package” to require issue correction before resubmitting for recertification because while implied that fixes would be implemented before attempting recertification, it must be clearly stated as BAR will not accept a known defective DAD for recertification.

Section 5.2.4: The new requirement “The DAD Vendor shall supply testing results which prove that all outstanding issues have been mitigated. BAR may request additional testing by the DAD Vendor.” was added because BAR has received fixes from DAD Vendors that have failed to correct identified issues. This change is necessary to ensure a properly working DAD and to reduce wasted effort expended when retesting a correction more than once.

Text below Section 5.2.4: In the second paragraph, the words “if any necessary changes have been completed and” were added to ensure any partially implemented corrective releases have been fully deployed. This change is necessary because BAR has experienced DAD Vendor DAD corrections that have taken too long to fully deploy, potentially overlapping the DAD recertification date. This requirement ensures known corrections are completed no later than the recertification date.

In the second paragraph, the phrase “Smog Check Program” has been replaced with “vehicle inspection programs”. This change was necessary since the DADs built to the updated DAD specification will be used in both BAR’s Smog Check Program and BAR’s Vehicle Safety Systems Inspection Program.

The phrase “Certification Testing Event” were added in front of the phrase “collection period” to use the current terminology as established in earlier section 5.1.

The word “device” was replaced with the word “DAD” because the word “device” was different than how the word “DAD” has been used throughout the document. This makes the sentence consistent with the rest of the document.

The words “Manager of Program Support” were replaced with the words “DAD Certification Lead Engineer” because this is the proper title of the BAR staff member.

Section 5.3: Decertification or Citation

This DAD specification section explains to the DAD Vendors the procedural methodologies and requirements involved in the decertification or Citation process.

Section 5.3: Decertification or Citation: In the first paragraph, the word “firmware” was added to clarify that both software internal to the DAD (firmware) and software external to the DAD must be furnished. This is necessary because the DADs use both software and firmware, and failure to address both can cause the DAD to not meet DAD specification requirements leading to cause for decertification. The word “Specification has been replaced with the phrase “DAD specification”. This was done to clarify which specification is being referenced. The phrase “the California Smog Check Program” has been replaced with “California’s vehicle inspection programs”. This change was necessary since the DADs built to the updated DAD specification will be used in both BAR’s Smog Check Program and BAR’s Vehicle Safety Systems Inspection Program.

Decertification

This DAD specification section explains to the DAD Vendors the procedural methodologies and requirements involved in the decertification process.

There are no changes to the Decertification section of the DAD specification beyond the changes that apply throughout the document.

Citation

This DAD specification section explains to the DAD Vendors the procedural methodologies and requirements involved in the citation process.

In the eighth paragraph, the word “must” was replaced with the word “shall”. There is no discernable difference between how ‘shall’ and ‘must’ are interpreted by BAR. This change was necessary to standardize the language used in BAR regulations.

Appendix A Application for Certification: Appendix A has been removed because the information collected on the form in Appendix A has been moved to requirement 5.1.3.1. This was done so that the Certification Submittal Package physical or electronic form can be changed without the need for regulatory change. In addition, the following has been added to the information collected, if applicable: partnering company(ies) name, partnering company(ies) address, partnering company(ies) phone number, partnering company(ies) email address, partnering company(ies) website. This was done because during the administration of the current DAD specification, BAR has found that although the DAD Vendor is responsible for meeting the requirements, they may depend on other companies to meet some of the requirements. Having the additional information allows BAR to completely understand which company is meeting which part of the DAD specification and allows BAR to reach out to these companies in addition to the DAD Vendor, when issues arise. See Section 5.1.3.1 for the complete listing of the information required.

Appendix B Disclosure Agreement: Appendix B has been removed because the Disclosure Agreement provided no protection to the station and was logistically complicated for both the DAD Vendors and BAR.

Economic Impact Assessment

The regulatory proposal will have the following effects:

- This regulatory proposal will not create or eliminate jobs within the State of California. The proposed revision imposes minor additional equipment cost since procurement of an updated DAD would be required. BAR has the authority to comprehensively revise the specifications every five years, per Health and Safety Code Section 44036(e) “A more comprehensive revision to the specifications may be required not more often than every five years.” Based on discussions with current DAD Vendors BAR anticipates the average cost for the updated DAD would be about $3000. BAR sees no need to submit financial mitigation measures to the Governor and Legislature since the anticipated updated DAD cost is less than $10,000, per Health and Safety Code Section 44036(c)(2) “If existing smog check stations licensed pursuant to this chapter or training institutions certified pursuant to Section 44030.5 are required to make investments of more than ten thousand dollars ($10,000) to acquire equipment to meet the requirements of this subdivision, the department shall submit recommendations to the Governor and the Legislature for any appropriate mitigation measures, including, but not limited to, subsidies, equipment leases, grants, or loans.”

- The updated DAD models are expected to have at least as good life expectancy as the current DADs which have been in service for over eight years. BAR does not anticipate the need for the updated DAD models to be replaced frequently. BAR anticipates that the updated DAD cost would not be so insurmountable as to put Smog Check stations out of business and cause an increase in unemployment given the average Smog Check inspection fee of $60. DAD Vendors may include the updated DAD in a lease option that is currently available for the OIS.

- This regulatory proposal will not create new business or eliminate existing businesses within the State of California. For Smog Check stations, the proposed revisions impose minor additional equipment cost to procure one DAD for each OIS used in the station. Existing businesses will not be eliminated as the additional equipment cost is minor, absorbable, and if necessary, passed on to consumers in the market determined inspection fee.

- This regulatory proposal will not affect the expansion of businesses currently doing business within the State of California. For Smog Check stations, the proposed revisions impose minor additional equipment cost to procure a DAD for OIS. The additional equipment cost is minor, absorbable, and if necessary, passed on to consumers in the market driven inspection fee.

- This regulatory proposal lessens health care costs by reducing the incidence of air pollution when vehicle emission control system faults are ignored. The proposal also protects consumers from financial loss due to the purchase of faulty vehicles.

Adverse Economic Impact Assessment

BAR has made an initial determination that the proposed regulatory revision will not have a significant adverse impact on businesses, including small businesses, and will not impact the ability of California businesses to compete with businesses in other states. The proposed revision will impose an estimated cost of $3000 per DAD, required for each OIS. The proposed regulation should not significantly impact the ability of California businesses to compete with businesses in other states. The one-time equipment purchase cost is minor, absorbable, and if necessary, passed on to consumers in the market-driven inspection fee.

Cost Impacts on Representative Private Persons or Businesses

Other than the estimated $3000 equipment cost per DAD (potentially less if leased), BAR is not aware of any cost impacts that a representative private person or business would necessarily incur in reasonable compliance with this proposed action.

Consideration of Alternatives

No reasonable alternatives to this regulatory proposal would be either more effective in carrying out the purposes for which the action is proposed or would be as effective or less burdensome to affected private persons and equally effective in achieving the purposes of the regulations in a manner that ensures full compliance with the law being implemented or made specific.

Alternatives considered included attempting to update the current, in use DADs to collect additional fraud detection data and the communication with the newer generation of vehicles. The extent of changes and discussions with the existing DAD Vendors resulted in the realization that this path was not viable and that an updated replacement DAD was the preferred path.

Duplication or Conflicts with Federal Regulations

No duplication exists between the proposed revisions and Federal regulations.

Mandated by Federal Law or Regulations

The proposed revision is not within a regulation mandated by Federal law or regulations.

INFORMATION RELIED UPON:

01. California Legislative Information, Assembly Bill No. 2289 (Eng, 2009-10 Legislative Session) (includes history, text, bill analysis and veto message) http://leginfo.legislature.ca.gov/faces/billNavClient.xhtml?bill_id=200920100AB2289

02. Smog Check Performance Report (An Analysis of Roadside Inspection Data) 2020, 7/1/2020, https://www.bar.ca.gov/pdf/2020_Smog_Check_Performance_Report.pdf

03. *GPS TTFF* and startup modes (PDF). Measurement Systems Ltd.

04. RADIONOVA RF Module Part No. M10578-A2 Specification

05. NEO-6 u-blox 6 GPS Modules Data Sheet

06. CCR, Title 13, Section 1968.2, adopted 11/22/2022

UNDERLYING DATA:

01. Department of Consumer Affair's Style Guide, Revised August 2019.

02. National Marine Electronics Association (NMEA) 0183 Standard for Interfacing Marine Electronic Devices Version 4.10 standard, dated June 2012

03. National Geospatial-Intelligence Agency (NGA) Standardization Document, Department of Defense World Geodetic System 1984, dated 2014-07-08

04. IEC 61000-4-2 - International Electrotechnical Commission (IEC) immunity standard on Electrostatic Discharge (ESD), dated 2008-12-09

05. SAE J1978 200204, "OBD II Scan Tool - Equivalent to ISO/DIS 15031-4: December 14, 2001", revised 2002-04

06. SAE J1962 201607, "Diagnostic Connector - Equivalent to ISO/DIS 15031-3: December 14, 2001", revised 2016-07

07. SAE J1979 201702, "E/E Diagnostic Test Modes", revised 2017-02

08. SAE J1979-2 202104, "E/E Diagnostic Test Modes: OBDonUDS", issued 2021-04

09. SAE J1979-DA 202104, "Digital Annex of E/E Diagnostic Test Modes", issued 2021-04

10. SAE J2534-1 201510, “Recommended Practice for Pass-Thru Vehicle Programming”, revised 2015-10

11. ISO 14229-1:2020 “Road vehicles – Unified diagnostic services (UDS)”, dated 2020-02

12. FCC Part 15 Class A, dated 04-03-2023

13. ISO 9141-2:1994 amended 1:1996, dated 1996-12

14. Volkswagen Group of America K-Line Communication Description dated 11/20/2009

15. SAE J1850 200606, Class B Data Communication Network Interface, Reaffirmed 2006-06

16. ISO 14230-4: Road vehicles - Diagnostic systems - Keyword protocol 2000 - Part 4: Requirements for emission-related systems, dated 2000-06-01

17. Keyword Protocol 2000 Data Link Layer Recommended Practice, Version 1.5, dated October 1, 1997

18. ISO 15765-4: Road vehicles - Diagnostic communication over Controller Area Network (DoCAN) - Part 4: Requirements for emissions-related systems, dated 2021-07

19. A summary of the most common mistakes when implementing the OBD on CAN (ISO15765-4) initialization sequence written by DaimlerChrysler AG, Mercedes Car Group Vehicle Diagnostic Engineering

20. ISO 2768-1: General tolerances - Part 1: Tolerances for linear and angular dimensions without individual tolerance indications, dated 1989-11-15

21. DAD Communication Specification

22. DAD Encryption Specification