Validation of Independently Produced VCIs

Why is a validation of independently developed VCIs so important?

Re-commissioning (reprogramming) ECUs, software updates and re-initialisation of components is nowadays a substantial part of maintenance or repair of modern vehicles. Independent operators must be enabled to complete the repair job within their own premises or at the roadside. In this context, it is crucial that multi-brand versions of the tools, known as Vehicle Communication Interfaces (VCIs), are offered by independent tool manufacturers. Without such generic VCIs, multi-make repairers and roadside patrols would have to buy all of the proprietary VCIs from all vehicle manufacturers, which is not a cost effective solution.

Why is a validation needed?

Although ISO 22900 and SAE J2534 set parameters within which vehicle manufacturers must work, both standards leave room for interpretation when it comes to their implementation. Vehicle manufacturers have discretion about the way in which they operate within those parameters, as there is a variety of, for example, communication response times. As such, an independent VCI manufacturer would need to know the precise limits set by each vehicle manufacturer for his VCI to function correctly. This is why it is important that vehicle manufacturers provide a way of validating the compatibility of multi-brand VCIs and their own application (interpretation) of the standard(s).

How to achieve compatibility of independently developed VCIs?

Vehicle manufacturers already propose this type of validation to VCI manufacturers of their choice. As validations are however so crucial to finalise modern repair and maintenance jobs correctly and efficiently, the Euro 5 Comitology amendment simply clarifies that vehicle manufacturers shall not restrict to whom it will offer a validation of compatibility.

This is why the Commission amendment, which includes the principle of a validation process into the Euro 5 provisions, is sound.

Bd de la Woluwe 42 bte 5 BE-1200 Brussels – Tel. : +32 2 761 9510 – Fax : +32 2 762 1255
E-mail : secretariat@egea-association.eu - Website : www.egea-association.eu IBAN: BE37 310 14941 3129

The amendment did however not specify at that stage *how* vehicle manufacturers could propose such a validation. Nonetheless it was always understood that vehicle manufacturers would be free to determine the modalities (e.g. outsourcing).

If it is felt desirable to add specific language on *how* vehicle manufacturers may offer such a validation, i.e. by providing the necessary information so that independent tool producers can conduct such a validation themselves, EGEA would like to kindly submit the following considerations:

EGEA proposal

EGEA is open to the proposal to conduct a self-validation, provided that the legal requirements are robust. Therefore, it should be made clear that vehicle manufacturers must make available a test environment to independent tool producers so that they can conduct such a validation themselves.

Such a test environment must consist of:

a) **An implementation guide**
b) **Communication test specifications**
c) **Software test-environment (including ECU hardware)**

Commission Text	Proposal
2.3. Reprogramming of vehicle control units shall be conducted in accordance with either ISO 22900 or SAE J2534. For the validation of the compatibility of the manufacturer-specific application and the vehicle communication interfaces (VCI) complying to ISO 22900 or SAE J2534, the manufacturer shall offer a validation of independently developed VCIs. The conditions of Article 7(1) of Regulation (EC) No 715/2007 apply to fees for such validation. **(…)**	2.3. Reprogramming of vehicle control units shall be conducted in accordance with either ISO 22900 or SAE J2534. For the validation of the compatibility of the manufacturer-specific application and the vehicle communication interfaces (VCI) complying to ISO 22900 or SAE J2534, the manufacturer shall offer a validation of independently developed VCIs. It can either do this in-house or make available an implementation guide, a software test-environment (incl. ECU hardware) and communication test specifications required for a VCI manufacturer to conduct such a validation themselves. The conditions of Article 7(1) of Regulation (EC) No 715/2007 apply to fees for such validation.

In more detail:

a) Implementation guide

As already explained, the standards SAE J2534 and ISO 22900 leave (quite) some room for interpretation when it comes to their implementation.

Some Examples:

- Correct timing when initialising the communication: ECU expects response from VCI within a defined time frame. This time frame is not exactly specified within the standards and can vary from VM to VM.

- The sequence of commands during communication set-up is not exactly defined in the standards and can vary for each implementation.
- Is there a communication with only one ECU or a parallel communication with several ECUs, especially when initializing the communication between VCI and ECU.
- Does the VM use only one communication bus or two communication busses in parallel (e.g. CAN and K-Line). SAE J 2534 allows CAN, K-Line and SAE J 1850 to be used in parallel. Single or parallel communication and used communication busses can significantly vary from VM to VM.
- Supported computer operation systems by the VM pass thru software.

As such, the tool manufacturer needs guidance in the form of an implementation guide.

An implementation guide is a description of how the vehicle manufacturer implemented both standards into his own proprietary reprogramming systems.

Especially ISO 22900 leaves a high degree of freedom in implementation. The manufacturers of independent pass-through devices have to know which part and what technical definitions are used by the respective VM.

The specifications do exist within the VM organisation; they can be extracted by vehicle manufacturers and given as isolated documents (e.g. 15 out of 100 pages). As such, making available such an implementation guide is not burdensome for vehicle manufacturers.

Providing an implementation guide will significantly reduce questions from tool manufacturers to VMs when adapting the tool manufacturer's pass-through software to the VM's web portal. In total the provision of an implementation guide will reduce the overall effort concerning pass-through validation for both VMs and VCI manufacturers

b) Communication test specifications (how)

Test specifications describe test cases, which serve to check the correct implementation of the standards (e.g. timings, parallel or single bus communication, data transfer, initialisation and finalisation of the communication).

Test specifications are a description of reference test cases, e.g.:

- Description of what is checked by the test case?
- Which ECU (sample ECU) has to be used?
- Which communication busses are used and tested?
- How can the test case be accessed and activated on the VM portal?
- Step-by-step description of how to carry out the tests.

c) Test environment (implementation of the test case)

A software test environment is needed to check the implementation of the standard on the generic VCI of the tool manufacturer. It is a check to see whether the implementation functions correctly.

The test environment shall consist of:

- Tests to re-programme software via the VM portal, which can be accessed by the tool manufacturer.

- One or several test ECUs.
- Tests to re-programme software must be allowed to be conducted as often as needed or required (when using a vehicle to re-program a test can usually be carried out only once for each ECU!)
- If the VM whilst flash programming is using different communication busses, then test cases for each communication bus must be provided (if so in single and parallel communication mode)
- If both standards are used for different ECUs, different test cases for both standards have to be made available.

Benefit for the VMs: The test environment has to be set up only once for all tool manufacturers. Questions from tool manufacturers concerning the VM's implementation and tests will be reduced significantly. However, a contact point should be indicated for possible questions.