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Supplement 5 to Annex 1 to the FDF EETS and Fuel Card Providers Ordinance

CCC Integration Test Specification - Level 2

EUROPEAN ELECTRONIC TOLL SERVICE FOR THE LSVA

VERSION 2.1

CCC Integration Test Specification

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1 Introduction

1.1 Scope

The scope of the CCC integration test specification mirrors the requirements in Supplement 2, which is based on ISO 12813.

It defines the prerequisites for and the CCC integration test cases for the EETS-OBE, which are intended to be carried out at the FCA's test facilities at Interlaken.

1.2 List of changes

Version	Date	Section	Change
2.0	01.03.2020		First published version
2.1	20.06.2020	3.3	Test facility configuration and expected behaviour exchanged between CCC-01 and CCC-02

1.3 References

The CCC integration test specification within this document are based on the standards and documents listed below:

Reference
[1] Annex 1 to the FDF EETS and Fuel Card Providers Ordinance: Technical and Operational Requirements for EETS Provider
[2] Supplement 2 to annex 1: LSVa Compliance Check Communication
[3] ISO 12813 2019; Electronic fee collection - Compliance check communication for autonomous systems
[4] ISO 13143-1 2016; Electronic fee collection - Evaluation of on-board and roadside equipment for conformity to ISO 12813 - Part 1: Test suite structure and test purposes
[5] EN 300 674-1 2004; Electromagnetic compatibility and Radio spectrum Matters (ERM); Road Transport and Traffic Telematics (RTTT); Dedicated Short Range Communication (DSRC) transmission equipment (500 kbit/s / 250 kbit/s) operating in the 5,8 GHz Industrial, Scientific and Medical (ISM) band; Part 1: General characteristics and test methods for Road Side Units (RSU) and On-Board Units (OBU)
[6] ETSI/TS 102 486-1-2 2008; Intelligent Transport Systems (ITS); Road Transport and Traffic Telematics (RTTT); Test specifications for Dedicated Short Range Communication (DSRC) transmission equipment; Part 1: DSRC data link layer: medium access and logical link control; Sub-Part 2: Test Suite Structure and Test Purposes (TSS&TP)
[7] ETSI/TS 102 486-2-2 2008; Intelligent Transport Systems (ITS); Road Transport and Traffic Telematics (RTTT); Test specifications for Dedicated Short Range Communication (DSRC) transmission equipment; Part 2: DSRC application layer; Sub-Part 2: Test Suite Structure and Test Purposes (TSS&TP)

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1.4 Terms and abbreviations

See Supplement 2.

2 Integration tests specification

2.1 General

The requirements for the EETS-OBE CCC integration tests are defined in Supplement 2, notably in section 3 regarding the transaction requirements.

The overall scope of the CCC integration test cases is to evaluate the OBE with respect to the CCC transactions requirements. The integration test cases cover correct transactions and correct attribute data content.

The tests of the DSRC interface (CCC) are carried out by the EETS provider as a self-test under its own responsibility and at its own risk on the FCA's test facility.

2.2 System under test

Each EETS-OBE type (with different equipmentClass and/or ManufacturerID) of the approval process has to be tested. The EETS provider shall use at least 3 samples of each EETS-OBE type for the CCC integration tests.

The EETS provider shall make available the EETS-OBE DSRC test keys and EFC contract data (details see 4.1) for the CCC integration tests, to the FCA printed or as a text file.

2.3 CCC integration tests facilities

The EETS provider shall use the FCA's test facilities at Interlaken. The test facilities at Interlaken are operated by FCA personnel.

The test facilities contain of the following three beacon types:

- Swiss entry border beacon
- Swiss exit boarder beacon
- Enforcement beacon

During the tests, the test facilities will automatically generate the following test documentation:

- CCC transaction protocol (bit-level documentation of CCC data exchanged between OBE and RSE) for each complete or aborted transaction.
- Test reports that summarising all performed transactions with its results. The report contains all attribute data transmitted by the OBE relevant for the LSVA toll domain.

This test documentation will be provided to the EETS provider as an input for its test report.

2.4 Test case execution

All test case shall be successfully executed at least three times in a row with each OBU sample with each speed listed below, unless otherwise explicitly specified.

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Each test case shall be executed with the following speeds:

- Walking speed (less or up to 20 km/h)
- Highway speed, i.e. 80 km/h

2.5 Reporting of test results

The EETS provider is responsible for providing FCA with a concise test report on the results of the execution of the tests defined by the test cases in this document (sections 3). The concise test report shall contain, at least, the following information:

- Identification of the EETS provider (legal name and contact details)
- Unique test report identification
- Identification of the system under test (EETS-OBE type identification)
- Identification of used test environment (information provided by the FCA)
- Overall result of the executed tests
- For each test case, the result of the executed test
 - Test case ID (as defined in this document, TP ID)
 - Overall verdict of the test result (passed, inconclusive or failed)
 - In case of test result inconclusive or failed, a problem or failure description
 - Detailed verification results, e.g.
 - CCC transaction result
 - OBE signalling to the driver as expected
 - Attribute data content verification result
- Date and signature of the test manager

2.6 Prerequisites

The EETS provider shall make available to the FCA, in accordance with the general requirements and conditions as defined in Annex 1 (in electronic form in German or English), before the realisation of the integration tests

1. the completed protocol compliance implementation statement (PICS), based on the PICS proforma in Annex B.4 in ISO 12813, associated with the OBE to be tested
2. the completed conformance test protocol associated with the OBE to be tested based on annex C in ISO 13143-1 or equivalent.
3. the associated OBE user manual, notably including the description of the signalling of the OBE status to the user via its man-machine interface

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4. the declaration of the OBE conformity (DoC) to the CCC specification, which has been duly signed. The conformity assessment of the EETS-OBE to the CCC specification shall be made according to ISO 13143-1 or an equivalent tests specification.

The successful verification of the requirements contained in the CCC specification according to the recommended tests, as defined in ISO 13143-1 (updated to reflect ISO 12813), gives the supplier or its representative the right to claim presumption of conformity and to issue the associated declaration of conformity (DoC) to the EETS CCC Specification (ISO 12813).

It should be noted that the use of ISO 13143-1 implies the use of the referenced underlying test specifications for evaluation of OBE for conformity to ISO 12813, notably the following specifications:

- DSRC physical layer according to EN 300 674-1
- DSRC medium access and link control according to ETSI/TS 102 486-1-2
- DSRC application layer according to ETSI/TS 102 486-2-2

However, it is not mandatory to assess compliance according to ISO 13143-1, updated to reflect ISO 12813. A supplier that chooses another means to prove compliance loses the benefit of the presumption of conformity and has to explain the rationale for his compliance statement to an EETS-Notified Body for his opinion on the subject. A supplier that has chosen this approach is only allowed to issue a DoC by including a documented favourable opinion on the subject by an EETS- Notified Body.

The FCA reserves its right to request from the EETS provider further documentation regarding the OBE user manual, OBE technical specification, tests undertaken to assess the OBE's conformity to the OBE specification and the associated results.

3 CCC integration test cases

3.1 Overview

The test cases shall verify that the EETS-OBE supports the core transaction with one of the following ending steps

- the Tracking phase,
- the Release phase,
- and the Tracking and Release phases.

In each test case listed above the OBE HMI signalling according to the requirements in 2.5 Supplement 2 to the driver shall be verified. To check that the OBE signals a "not ok" to the driver an additional test case is added, see 3.4.

In at least one transaction of each OBE sample, with and without a trailer declared at the EETS-OBE, the correctness of the data content of the attributes shall be checked, see 4.2.

Remark:

The time between two subsequent attempts to carry out CCC transactions at the same beacon shall be at least 255 seconds, in view of the OBE behaviour in the initialisation phase.

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3.2 Test case template

The CCC integration test cases, referred to test purposes (TPs), are defined below using the convention defined in Table 1, based on ISO 13143-1.

Table 1 — Definition of a test purpose (TP)

TP ID	The TP ID is a unique identifier within the context of this document (the prefix CCC followed by a sequence number, i.e. CCC-XX)
Title	Short description of test purpose objective.
Reference	The reference should contain the references of the subject to be validated by the actual TP (specification reference, clause, paragraph), or the reference to the standard document defining the TP.
TP Origin	Indicates if the TP is identical to a TP defined in another test specification, derived from a TP defined in another test specification, or specific for this specification.
Initial condition	The condition defines in which initial state the EETS-OBE has to be to apply the actual TP.
Test facility configuration	Definition of the used CCC integration tests facilities configuration for the TP.
Stimulus and expected behaviour	Definition of the events the CCC integration tests facilities performs, and the events that are expected from the EETS-OBE to conform to the EETS CCC specification. If the observed behaviour is identical to the expected one, then the EETS-OBE successfully passed the test. If not, then the test result is either failed or inconclusive.

3.3 Definition of positive test cases

Every test case in this section shall be executed according to 2.4 with a trailer declared at the EETS-OBE. An additional repetition of the test cases in this section shall be executed without a trailer declared at the EETS-OBE at any speed.

TP ID	CCC-01
Title	Verify that the EETS-OBE supports the Tracking
Reference	The CCC tracking phase as defined in 3.2 in Supplement 2
TP Origin	Derived from ISO 13143-1
Initial condition	OBE correctly initialized
Test facility configuration	CCC integration tests facilities correctly initialized. Test at Swiss entry border beacon.
Stimulus and expected behaviour	Stimulus: <ul style="list-style-type: none"> – Steps 1, 2a, 2b, and 3 as defined in 3.1 Supplement 2 – Step 1 as defined in 3.2 Supplement 2 Expected behaviour: <ul style="list-style-type: none"> – RSE: Successful CCC transaction – OBE: signal ok to the driver

TP ID	CCC-02
Title	Verify that the EETS-OBE supports the Release
Reference	The CCC release phase as defined in 3.3 in Supplement 2
TP Origin	Derived from ISO 13143-1
Initial condition	OBE correctly initialized

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Test facility configuration	CCC integration tests facilities correctly initialized. Test at Swiss exit border beacon.
Stimulus and expected behaviour	Stimulus: <ul style="list-style-type: none"> - Steps 1, 2a, 2b, and 3 as defined in 3.1 Supplement 2 - Step 1 as defined in 3.3 Supplement 2 Expected behaviour: <ul style="list-style-type: none"> - RSE: Successful CCC transaction - OBE: no signal to the driver

TP ID	CCC-03
Title	Verify that the EETS-OBE supports the Tracking and the Release
Reference	The CCC tracking and release phases as defined in 3 in Supplement 2
TP Origin	Derived from ISO 13143-1
Initial condition	OBE correctly initialized
Test facility configuration	CCC integration tests facilities correctly initialized. Test at Swiss enforcement beacon.
Stimulus and expected behaviour	Stimulus: <ul style="list-style-type: none"> - Steps 1, 2a, 2b, and 3 as defined in 3.1 Supplement 2 - Step 1 as defined in 3.2 Supplement 2 - Step 1 as defined in 3.3 Supplement 2 Expected behaviour: <ul style="list-style-type: none"> - RSE: Successful CCC transaction - OBE: no signal to the driver

3.4 Definition of negative test cases

The test case below shall be executed according to 2.4, but only with walking speed (less or up to 20 km/h).

TP ID	CCC-04
Title	Verify that the EETS-OBE supports the Release
Reference	The CCC release phase as defined in 3.3 in Supplement 2
TP Origin	-
Initial condition	OBE correctly initialized
Test facility configuration	CCC integration tests facilities is correctly initialized, except for a wrong authentication key. Test at Swiss entry border beacon.
Stimulus and expected behaviour	Stimulus: <ul style="list-style-type: none"> - Steps 1, 2a and 3 as defined in 3.1 Supplement 2 - Step 1 as defined in 3.3 Supplement 2 Expected behaviour: <ul style="list-style-type: none"> - RSE: Reduced successful CCC transaction - OBE: signal not ok to the driver

4 Test data requirements

4.1 Contract issuer

The EETS provider shall provide the test OBE EETS contract data and plain keys for the initialisation of the CCC integration tests facilities. In detail the following data elements are required:

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- The individual CCC-ContextMark values:
 - EETS provider nationality (e.g. DE, IT, FR, ...)
 - providerIdentifier (IssuerIdentifier)
 - typeOfContract
 - contextVersion
- EquipmentClass
- ManufacturerID
- Authentication, Non-Repudiation an Access Credential key reference
- Plain (unencrypted) Authentication and Access Credential test key

4.2 OBE transaction data

The EETS provider shall be able to verify the transaction data content of the attributes of each OBE sample received and displayed by the CCC integration tests facilities. The following data according to Supplement 2 will be displayed and shall be checked:

Attribute 17: VehicleClass

- Trailer Indicator
- European Vehicle Group

Attribute 16: VehicleLicencePlateNumber

Attribute 19: VehicleAxles

- VehicleAxlesNumber. NumberOfAxles.Trailer
- VehicleAxlesNumber. NumberOfAxles.Tractor

Attribute 20: VehicleWeightLimits

- vehicleMaxLadenWeight
- vehicleTrainMaximumWeight
- vehicleWeightUnladen

Attribute 22: VehicleSpecificCharacteristics

- environmentalCharacteristics.euroValue

Attribute 24: EquipmentOBUId

Attribute 32: PaymentMeans

- personalAccountNumber (PAN)

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- paymentMeans-ExpiryDate

Attribute 46: TrailerCharacteristics

- trailerDetails.trailerType
- trailerDetails.trailerAxles
- trailerMaxLadenWeight