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Foundations Directorate

Supplement 3 to Annex 1 to the EETS- and NETS-Provider-Ordinance FOCBS

EETS Provider Interface

EUROPEAN ELECTRONIC TOLL SERVICE FOR THE LSVA

VERSION 3.0

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1 Introduction

1.1 Scope

This document is a supplement to Annex 1 and contains the requirements and specification for the interface between the EETS provider and the Federal Office for Customs and Border Security (FOCBS), the Toll Charger of the LSVA.

The relevant information regarding the toll context and the toll transaction policy required for implementation of this interface can be found in Annex 1.

This document is written under the assumption that the reader is familiar with the standards EN ISO 12855, CEN/TS 16986 and EN ISO 17575-1.

1.2 List of changes

Version	Date	Section	Change
2.0	01.03.2020		First published version
2.1	12.06.2020	2.3.2.1 2.3.2.3 2.3.2.4 2.5.5 2.9.2 2.9.7.1 3.1 3.5	Figure with overview exchanged Examples of declarations over several days No overlap between UsageStatements two AduReasonCodes added actionCode value 0 (send) one AduReasonCode added New section EETS Service Location inserted Certificates procedure adapted
2.2	21.08.2020	2.3.2.4 2.9.1 to 2.9.7 2.9.8	With attribute <i>rawDataList</i> (SEQUENCE OF MeasuredRawData) added in correspondance to ASN.1 Precisions on the time periods for activations and deactivations Clarification on key conversion before encryption, key encryption methode and content of CertificateSerialNumber
2.3	01.01.2022	various	Renaming of the Federal Customs Administration (FCA) to the Federal Office for Customs and Border Security (FOCBS)
3.0	01.09.2024	various 2.3.2.3 2.7.3	Changes to the technical and operational requirements in line with the legal basis of the LSVA III system Post-documentation of implemented definitions Example 4; BeginOfPeriode and EndOfPeriode of 2nd declaration changed ADUReasonCode 802 ammended

1.3 References

The EETS provider Interface specified within this document is based on the standards and documents listed below:

Document	
[1]	Annex 1 to the EETS- and NETS-Provider-Ordinance FOCBS: Technical and Operational Requirements for EETS Provider
[2]	EN ISO 12855 2015; Electronic fee collection - Information exchange between service provision and toll charging
[3]	CEN/TS 16986 2016; Electronic Fee Collection - Interoperable application profiles for information exchange between Service Provision and Toll Charging
[4]	EN ISO 17575-1 2016; Electronic fee collection - Application interface definition for autonomous systems - Part 1: Charging
[5]	Supplement 2 to annex 1: LSVA Compliance Check Communication
[6]	ISO/IEC 8824-1 2015; Information technology - Abstract Syntax Notation One (ASN.1): Specification of basic notation
[7]	-
[8]	-
[9]	ISO/IEC 8825-4 2015/Cor 1:2018; Information technology - ASN.1 encoding rules: XML Encoding Rules (XER)
[10]	EN ISO 14906 2018; Electronic fee collection - Application interface definition for dedicated short-range communication. 2018; Electronic fee collection - Application interface definition for dedicated short range communication Amendment 1
[11]	EN 15509 2014; Electronic fee collection - Interoperability application profile for DSRC

1.4 Terms and abbreviations

See Annex 1

Additional terms below:

Term/Abbreviation	Meaning
ADU	Application Data Unit
APDU	Application Protocol Data Unit
APCI	Application Protocol Control Information
CCC	Compliance check communication (ISO 12813)

Term/Abbreviation	Meaning
Declaration	Notification of all information required for the assessment.
exception list	A list either of type black list or of white list.
OBU	On-board equipment = On-board unit = OBU
PAN	Personal account number, the primary user identifier in the EETS provider interface, data element according to EN ISO 14906.

2 Transactions and messages

2.1 General

All data is transmitted via an interface that essentially complies with EN ISO 12855 and CEN/TS 16986.

2.1.1 Transactions

The FOCBS uses the InfoExchange defined in section 2.2.2 for requests and confirmations. All data transmissions from the EETS provider to the FOCBS shall comply with the defined InfoExchange message in section 2.2.3.

The confirmation messages of EN ISO 12855 (e.g. InfoExchange with AckADU) are used to confirm or refuse the contents and functional correctness of the data at the application level.

The sequence diagrams in this section define the order of the application data unit (ADU) types used in the InfoExchange when transferring data between the FOCBS and the EETS provider.

A protocol for the transmission and acknowledgment of the individual messages will be provided by the underlying transport layer. The transport layer also provides functionality to ensure data confidentiality (encryption), integrity and authenticity (signature) of the messages. The transport layer is defined in section 3.

2.1.2 Message definition

The tables in this section define the use of InfoExchange with the associated ADUs in accordance with EN ISO 12855 and the data elements imported from EN ISO 17575-1. The semantics of the data elements applies as defined in EN ISO 12855 and EN ISO 17575-1 and is not repeated in this document. The restrictions and transaction definitions of CEN/TS 16986 are complied with whenever possible.

The column "Value range and description" in the tables contains if necessary:

- The detailed value range of the type attributes. The value range or assignment of values are given in decimal numeral system unless otherwise explicitly stated. Binary numbers are expressed using the notation 'B immediately following binary numbers, whereas hexadecimal numbers are expressed using the notation 'H immediately following hexadecimal numbers.
- Additional restrictions of the type attributes.
- Deviating definitions of the attributes compared to the standard EN ISO 12855, EN ISO 17575-1 and CEN/TS 16986 are denoted by Top-Up.
- Additional descriptions of the type attributes.

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The column "Qty" provides information about the frequency of attributes. In addition, this column determines whether optional attributes according to the mentioned standards shall be present or not in the LSVA context. In summary, this means:

- 0 = optional data element that shall not be transferred
- 1 = optional data element shall be transmitted, in case of sequence data element exactly one element shall be transmitted
- 0..n = none or at most n data elements,
1..n = at least 1 and at most n data elements,
where n is only limited by the maximum size of a message (see section 3.6.1).

The rows in the tables in section 2 are highlighted using the following rules and colour codes to provide a better overview and give some additional information:

- attributes to be transmitted are highlighted by noting these against white background
- attributes according to standards to be submitted but not used by the FOCBS are highlighted against orange background
- attributes not to be transmitted (number = 0) are highlighted against grey background
- attributes for future use in LSVA toll domain are highlighted against green background
- and attributes that are Top-Up to standards are highlighted against blue background

2.1.3 General requirements

The vehicle registration number (`licencePlateNumber` from `userId` and `vehicleLPNr` from `ChargeReport`) shall be the unique vehicle identifier for an EETS journey. The PAN (`pan` = personal account number from `userId` and `personalAccountNumber` in `paymentMeans` form `ChargeReport`) shall be the unique vehicle identifier for the communication in the EETS provider interface. During an EETS journey the combination of `pan` and `licencePlateNumber` shall not change.

2.1.4 Data type restrictions

For data elements that have not been otherwise restricted in terms of scope or format, the following restrictions apply:

- In the ASN.1 definition unlimited INTEGER shall not exceed the maximum value $2^{63}-1$.
- In the ASN.1 definition of non-limited types "UTF8String" or "OCTET STRING" shall not include more than 1024 characters or octets.
- All time data elements without a time base defined shall be in coordinated universal time (UTC).
- Data elements of the type GeneralizedTime shall have, according to ISO/IEC 8824-1, section 46.3, the format b) with a resolution of one second.

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2.1.5 ASN.1 files

The FOCBS will provide a complete set of ASN.1 files to the EETS provider. This set of ASN.1 files starts with the EN ISO 12855 module and includes

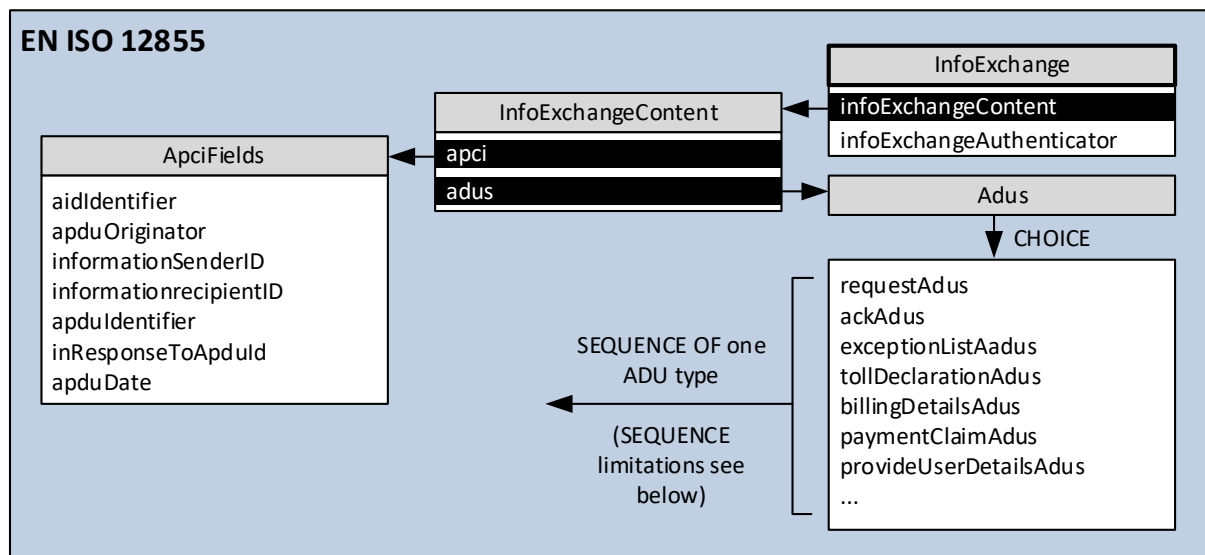
- all required definitions from CEN/TS 16986,
- all Top-Up definitions from the current document,
- and all required sub modules.

The provided ASN.1 sub modules will contain all enumeration and value range restrictions defined in the current document.

2.2 Basic protocol

2.2.1 Overview

The basic protocol is based on the InfoExchange from EN ISO 12855 shown below. For Adus CHOICE, only the variants required for the interface of the FOCBS are listed.



An InfoExchange shall contain a SEQUENCE OF with only one single ADU.

2.2.2 Messages from FOCBS to EETS provider

All messages from the FOCBS to the EETS provider are transmitted with the InfoExchange as defined below.

Data element	Qty	Value range and description
InfoExchange	1	
└ infoExchangeContent	1	
└ └ apci	1	
└ └ └ aidIdentifier	1	0 = EN ISO 12855:2015
└ └ └ apduOriginator	1	
└ └ └ countryCode	1	CH, binary (10 Bits) = 0111000101'B
└ └ └ providerIdentifier	1	FOCBS = 1
└ └ └ informationSenderID	1	

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	countryCode	1	CH, binary (10 Bits) = 0111000101'B
	providerIdentifier	1	FOCBS = 1
	informationrecipientID	1	Configured and registered Provider-ID of the communication channel for this provider.
	countryCode	1	
	providerIdentifier	1	
	apduIdentifier	1	0 to 2 ⁶³ -1
	previousApduId	0	
	nextApduId	0	
	inResponseToApduId	0..1	Used in response to a request or in case of confirmation (i.e. AckADU). Otherwise not present.
	apduOriginator	1	Configured and registered Provider-ID of the communication channel for this provider.
	countryCode	1	
	providerIdentifier	1	
	apduIdentifier	1	0 bis 2 ⁶³ -1
	apduDate	1	Shall specify a time stamp for the APDU
	adus	1	Only one ADU in one InfoExchange. Allowed ADU types (and Request CHOICE) are: - RequestADU (with CHOICE userDetailsRequest), defined in section 2.4.2 - AckADU, defined in section 2.9 - BillingDetailsADU, defined in section 2.5.2 - PaymentClaimADU defined in 2.7
	infoExchangeAuthenticator	0	
	authenticatorEFC	0	
	ackAuthenticatorEFC	0	

2.2.3 Message from EETS provider to FOCBS

All messages from the EETS provider shall be submitted to the FOCBS with the InfoExchange in accordance with the following definition.

Data element	Qty	Value range and description
InfoExchange	1	
infoExchangeContent	1	
apci	1	
aidIdentifier	1	0 = EN ISO 12855:2015
apduOriginator	1	Configured and registered Provider-ID of the communication channel for this provider.
countryCode	1	
providerIdentifier	1	
informationSenderId	1	The information shall be identical to the apduOriginator.
countryCode	1	
providerIdentifier	1	
informationrecipientID	1	
countryCode	1	CH, binary (10 Bits) = 0111000101'B
providerIdentifier	1	FOCBS = 1
apduIdentifier	1	0 to 2 ⁶³ -1
previousApduId	0	
nextApduId	0	
inResponseToApduId	0..1	Used in response to a request or in case of confirmation (i.e. AckADU). Otherwise not present.
apduOriginator	1	
countryCode	1	CH, binary (10 Bits) = 0111000101'B
providerIdentifier	1	FOCBS = 1
apduIdentifier	1	0 to 2 ⁶³ -1
apduDate	1	Shall specify a time stamp for the APDU
adus	1	Only one ADU in one InfoExchange.

Data element	Qty	Value range and description
		Allowed ADU types are: - AckADU, defined in section 2.9 - ExceptionListADU, defined in section 2.8 - TollDeclarationAdu, defined in section 2.3.2.2 - ProvideUserDetailsADU, defined in section 2.4.3
└ infoExchangeAuthenticator	0	
└ authenticatorEFC	0	
└ ackAuthenticatorEFC	0	

2.2.4 Error handling

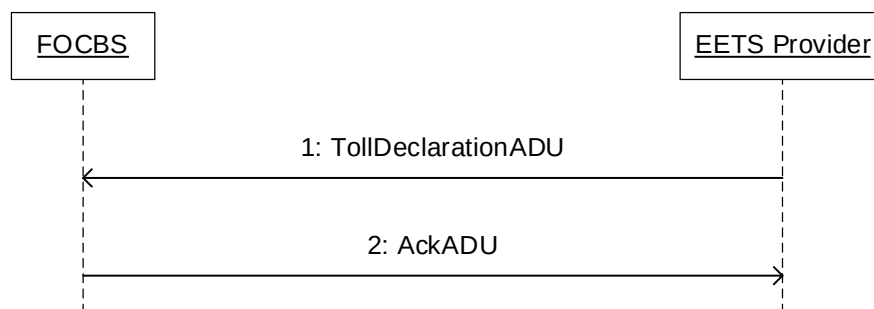
The correct syntax of the whole message will be checked by the transport layer described in section 3. Possible error message are described there.

In case of content and logical errors of the application protocol control information (apci) part of the APDU, an AckADU according to section 2.9.1 with apduAckCode (without an issue) listed in section 2.9.3 shall be sent by the FOCBS or EETS provider.

2.3 EETS journey declaration

2.3.1 Declaration requirements

The EETS provider shall automatically provide the FOCBS with all data regarding an EETS journey. The EETS journey declaration data consists of the journey position data and the vehicle parameters. The declaration process is shown below:



The following conditions apply:

- The transmission of the EETS journey declaration takes place automatically according to Annex 1.
- A TollDeclarationADU contains only the EETS journey declaration of a single journey and vehicle.
- An EETS journey completed on a single day shall always be transmitted as a single EETS journey declaration in one TollDeclarationADU.
- A multi-day EETS journey shall be split into one TollDeclarationADU per day of the EETS journey. For EETS journey days without vehicle moving an empty declaration (see `ChargeReport.usageStatementList`) is required. There shall be no time gaps in the daily EETS journey declaration (see requirements for `ChargeReport.reportPeriod`).
- An InfoExchange shall contain only TollDeclarationADUs of a single EETS journey.

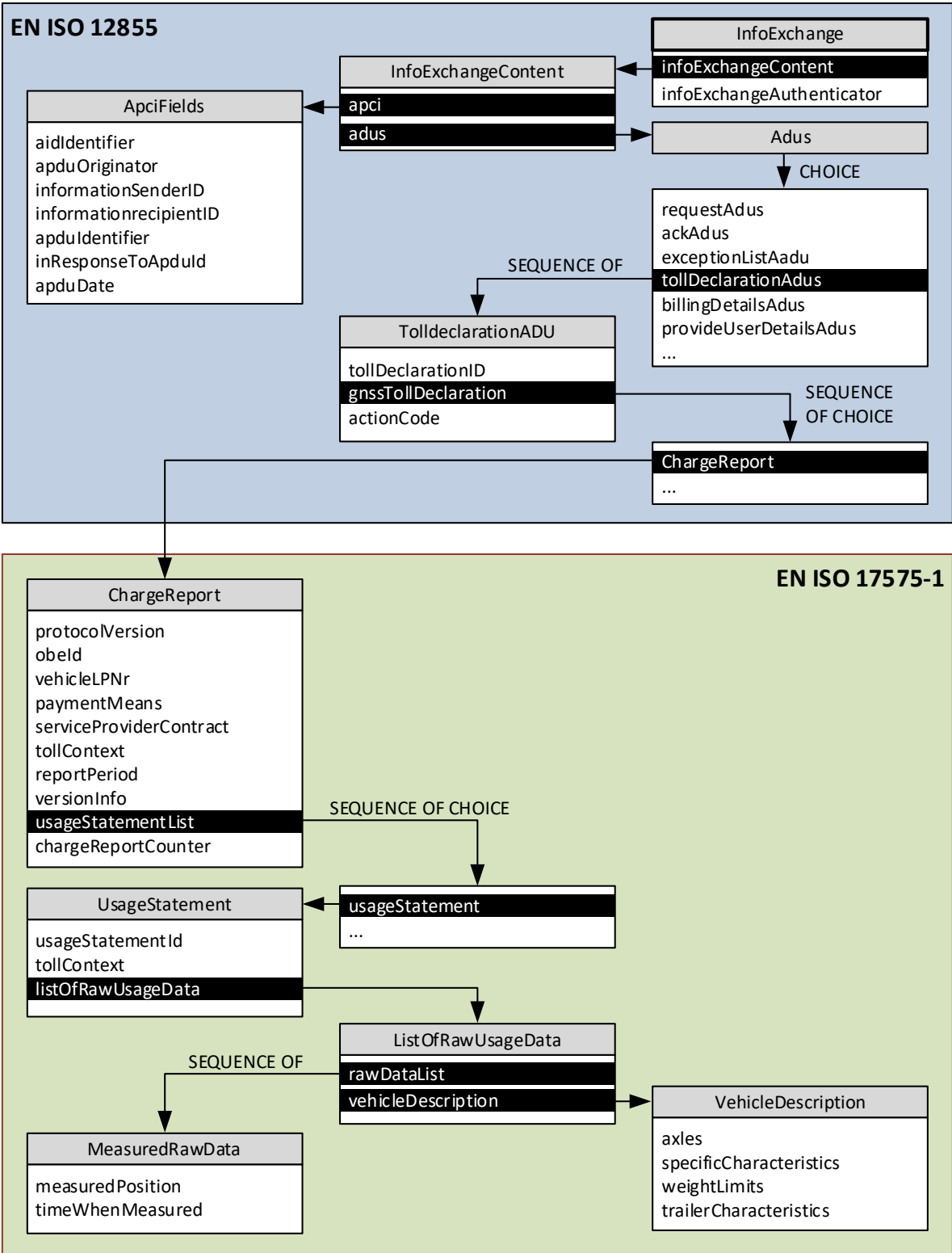
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- The transmission of the EETS journey declaration by the EETS provider is considered successful only after it has been acknowledged by the FOCBS with an AckADU (no single issue/error in any ADU existing).

2.3.2 EETS journey declaration message

2.3.2.1 Data structure overview

The TollDeclarationADU is used to transmit the EETS journey declaration. An overview of these data structures from EN ISO 12855 and EN ISO 17575-1 is shown in the figure below.



2.3.2.2 TollDeclarationADU

The EETS journey declaration, which is the position and vehicle data of the EETS journey, is transmitted automatically with a TollDeclarationADU according to the following table:

Data element	Qty	Value range and description
adu	1	TollDeclarationADU of a single EETS journey
└ tollDeclarationADU		
└ └ tollDeclarationId	1	
└ └ └ issuerID	1	Configured and registered Provider-ID of the EETS provider
└ └ └ └ countryCode	1	
└ └ └ └ providerIdentifier	1	
└ └ └ declarationID	1	0 to 2 ⁶³ -1 according to CEN/TS 16986:2016
└ gnssTollDeclaration	1	Contains the data of one or a part of an EETS journey according to section 2.3.2.3.
└ └ ChargeReport		
└ └ └ actionCode	1	Constant value 0 = send (normal sending of a Toll declaration)

2.3.2.3 ChargeReport

The position data and vehicle parameters of the EETS journey are transmitted in the data structure ChargeReport (defined in EN ISO 17575-1).

Data element	Qty	Value range and description
ChargeReport	-	
└ protocolVersion	1	Current constant value: 0 = EN ISO 17575-1:2016
└ obeId	1	
└ └ manufacturerId	1	0..65535, see ISO 14816 register
└ └ equipmentOBUID	1	According to EN ISO 14906
└ vehicleLPNr	1	Format and restrictions as defined in 2.3.2.6 VehicleLicencePlateNumber
└ └ countryCode	1	
└ └ alphabetIndicator	1	
└ └ licencePlateNumber	1	
└ paymentMeans	1	According to EN ISO 14906
└ └ personalAccountNumber	1	
└ └ paymentMeansExpiryDate	1	Shall not be expired for reportPeriod, it is the entry time and date of LSVA toll domain
└ └ └ year	1	
└ └ └ month	1	
└ └ └ day	1	
└ └ paymentMeansUsageControl	1	
└ serviceProviderContract	1	EFC-ContextMark (= CCC-ContextMark)
└ tollContext	1	Mandatory according to CEN/TS 16986:2016
└ └ countryCode	1	CH, binary (10 Bits) = 0111000101'B
└ └ providerIdentifier	1	FOCBS = 1
└ chargeReportFinalRecipient	0	
└ timeOfReport	0	
└ reportPeriod	1	Period of the EETS journey declaration
└ └ beginOfPeriod	1	Date and time of LSVA toll domain entry or in case of no entry the report date with time 00:00:00. Detailed definition

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Data element	Qty	Value range and description
		see remarks below.
endOfPeriod	1	Date and time of LSVA toll domain exit or in case of no exit the report date with time 23:59:59. Detailed definition see remarks below.
versionInfo	1	CHOICE basicVersionId
basicVersionId	1	Current status of the relevant components of the EETS provider Front End. See remark below.
usageStatementList	1	CHOICE usageStatement
usageStatement	0..n	0 = empty EETS journey declaration, see remark below 1...n UsageStatement according to 2.3.2.4
sumVatForThisSession	0	
accountStatus	0	
chargeReportCounter	1	0..2 ³² -1, OBE counter, mandatory in CEN/TS 16986:2016
mileage	0	
listOfCccAttributes	0	

Remarks:

- LSVA toll domain entry means date and time of the first position delivered in the domain entry declaration. This first position is geographically located before entering the LSVA toll domain.
- LSVA toll domain exit means date and time of last position delivered in the domain exit declaration. This last position is geographically located after leaving the LSVA toll domain.
- In case of a multi-day EETS journey declaration of n days, the FOCBS shall be able to check the EETS provider obligation to declare every day without gaps.
- In case of empty EETS journey declaration, **reportPeriod** shall covering then the whole day (00:00:00 to 23:59:59) without vehicle movement.
- In case an EETS journey starts inside LSVA toll domain, no LSVA toll domain entry has been occurred or detected, **beginOfPeriod** shall contain the report date and time of the first position delivered in the declaration.
- In case an EETS journey ends inside LSVA toll domain, no LSVA toll domain exit has been occurred or detected, **endOfPeriod** shall contain the report date and time of the last position delivered in the declaration.
- Therefore, the rules according to the following examples shall apply:

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Examples:

1. Single-day EETS journey in a single declaration:
 - Declaration of day X (LSVA toll domain entry and toll domain exit):
`beginOfPeriod` = Date and time of the first position delivered (see LSVA toll domain entry above).
`endOfPeriod` = Date and time of the last position delivered (see LSVA toll domain exit above)
2. Two-day EETS journey in two declarations
 - Declaration of day X (LSVA toll domain entry with no exit):
`beginOfPeriod` = Date and time of the first position delivered (see LSVA toll domain entry above).
`endOfPeriod` = Date X / time = 23:59:59
 - Declaration of day X+1 (LSVA toll domain exit with no entry):
`beginOfPeriod` = Date X+1 / time = 00:00:00
`endOfPeriod` = Date X+1 / time of the last position delivered (see LSVA toll domain exit above).
The `usageStatement (listOfRawUsageData)` may include a part of position data of day X to X+1.
3. Three-day EETS journey in three declarations
 - Declaration of day X (LSVA toll domain entry with no exit):
`beginOfPeriod` = Date and time of the first position delivered (see LSVA toll domain entry above).
`endOfPeriod` = Date X / time = 23:59:59
 - Declaration of day X+1 (no LSVA toll domain entry and exit):
`beginOfPeriod` = Date X+1 / time = 00:00:00
`endOfPeriod` = Date X+1 / time = 23:59:59
The `usageStatement (listOfRawUsageData)` may include a part of position data of day X to X+1.
 - Declaration of day X+2 (LSVA toll domain exit with no entry):
`beginOfPeriod` = Date X+2 / time = 00:00:00
`endOfPeriod` = Date X+2 / time of the last position delivered (see LSVA toll domain exit above).
The `usageStatement (listOfRawUsageData)` may include a part of position data of day X to X+2.
4. Single-day EETS journey in two declarations, late delivery of position data
Late delivery of position data may for example occur because the EETS OBE was not able to transmit all journey data on the days before due to unavailable data connection or early switch off.
 - Declaration day of X (LSVA toll domain entry with no (missing) exit):
`beginOfPeriod` = Date and time of the first position delivered (see LSVA toll domain entry above).
`endOfPeriod` = Date X / time = 23:59:59

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- Declaration day X+1 (LSVA toll domain exit on day X with no entry):
`beginOfPeriod` = Date X+1/ time = 00:00:00
`endOfPeriod` = Date X+1 / time = 00:00:01.
- The `basicVersionId` should contain as a minimum the major HW and SW versions of the OBE. The EETS provider shall deliver a description of the content of `basicVersionId` to the FOCBS.
- In case the EETS journey declaration message is representing a day without moving of the vehicle, the data element `usageStatementList` shall be empty.

2.3.2.4 UsageStatement

A usage statement (defined in EN ISO 17575-1), as shown in the following table, contains the complete list of position data and vehicle parameters for the part of an EETS journey with identical vehicle parameters (i.e., no trailer condition changes).

The position data requirements for the EETS journey declaration are defined in the Annex 1.

If the trailer parameters (trailer on/off or trailer weight) changes during the EETS journey, a new UsageStatement shall be generated. The new UsageStatement starts with the position data from this point in time with the new, changed trailer parameters.

An EETS journey can also for other reasons be split into multiple UsageStatement. The measuredPositions in the individual UsageStatements must not overlap under any circumstances, even across several ChargeReports.

Data element	Qty	Value range and description
<code>UsageStatement</code>	1	One UsageStatement per applicable tariff
└ <code>usageStatementId</code>	1	0..65535, Mandatory according to CEN/TS 16986:2016
└ <code>tollContext</code>	1	Mandatory according to CEN/TS 16986:2016
└ └ <code>countryCode</code>	1	CH, binary (10 Bits) = 0111000101'B
└ └ <code>providerIdentifier</code>	1	FOCBS = 1
└ <code>chargeReportFinalRecipient</code>	0	
└ <code>aggregatedFee</code>	0	
└ <code>sumVat</code>	0	
└ <code>aggregatedSingleTariffClassSession</code>	0	
└ <code>listOfChargeObjects</code>	0	
└ <code>listOfDSRCUsageData</code>	0	
└ <code>listOfRawUsageData</code>	1	
└ └ <code>rawDataList</code> (SEQUENCE OF └ └ └ <code>MeasuredRawData</code>)	1..n	Contains the gap-less position data of a part of an EETS journey.
└ └ └ <code>measuredPosition</code>	1	Position data requirements and coordinate system see Annex 1.
└ └ └ └ <code>longitude</code>	1	as defined in ISO 6709, in microdegrees, >0=east, <0=west, absolute value <=180°
└ └ └ └ <code>latitude</code>	1	as defined in ISO 6709, in microdegrees, >0=north, <0=south, absolute value <=90°
└ └ └ └ <code>altitude</code>	0	
└ └ └ <code>timeWhenMeasured</code>	1	Time in UTC, shall be a time in the reportPeriod
└ └ └ <code>nMEPData</code>	0	
└ └ └ <code>additionalGNSSData</code>	0	
└ └ <code>currentTariffClass</code>	0	
└ └ <code>vehicleDescription</code>	1	

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Data element	Qty	Value range and description
vehicleLPNr	0	
axles	1	Tractor and trailer axles
vehicleFirstAxleHeight	1	
vehicleAxlesNumber	1	
tyreType	1	
numberOfAxles	1	
trailerAxles	1	
tractorAxles	1	
class	0	
dimensions	0	
specificCharacteristics	1	
environmentalCharacteristics	1	According to EN ISO 14906
euroValue	1	0 = not present, 1 = EURO 1, 2 = EURO 2, 3 = EURO 3, 4 = EURO 4, 5 = EURO 5, 6 = EURO 6, 15 = EEV. EURO emission class (currently according to Annex 1 of the Directive 88/77/EEC) or EEV (currently according to the Directive 2005/55 / EEC (Annex I, section 6.2.1)
copValue	1	CO ₂ (in g/km) value. The European registration certificate element V.7. Cop value as defined in EC directive 2003/127/EC: noEntry (0) = default if value is unknown co2class1 (1) = below 101 g/km co2class2 (2) = 101 to 120 g/km co2class3 (3) = 121 to 140 g/km co2class4 (4) = 141 to 160 g/km co2class5 (5) = 161 to 200 g/km co2class6 (6) = 201 to 250 g/km co2class7 (7) = above 250 g/km
engineCharacteristics	1	The European registration certificate element P.3. Type of fuel or power source according to EN ISO 14906.
descriptiveCharacteristics	1	
futureCharacteristics	1	
ladenWeight	0	
weightLimits	1	According to EN ISO 14906
vehicleMaxLadenWeight	1	Maximum permissible laden mass of the vehicle in service in the Member State of registration (F.2) in 10 kg units, rounded downwards
vehicleTrainMaximumWeight	1	Maximum permissible laden mass of the whole vehicle in service in the Member State of registration (F.3) in 10 kg units, rounded downwards
vehicleWeightUnladen	1	Mass of the vehicle in service with bodywork, and with coupling device in the case of a towing vehicle in service from any category other than M1 (G), also with hitch in 10 kg units, rounded downwards. If the weight has not been registered, the value 0 shall be set.
trailerCharacteristics	1	According to section 2.3.2.5
noUsage	0	
additionalUsageInformation	0	

2.3.2.5 Trailer data

It is up to the EETS provider to decide whether to implement a detailed trailer weight declaration or the simplified trailer declaration (trailer available / no trailer).

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The following definitions specify the values of the data element `trailerCharacteristics` for both cases:

Trailer weight declaration:

The following table describes the values for the declaration of the correct trailer weight. The `trailerAxles`, `trailerMaxLadenWeight` and `trailerWeightUnladen` values are 0 if `trailerType` = 0 (no trailer is present).

Data element	Qty	Value range and description
<code>trailerCharacteristics</code>	1	
└ <code>trailerDetails</code>	1	
└ <code>trailerType</code>	1	0 = no trailer, 1 = pull-bar trailer, 2 = semi-trailer In case of no trailer (0) and <code>trailerAxles</code> > 0, for LSVA weight calculation a pull-bar trailer type will be used.
└ <code>trailerAxles</code>	1	Number of trailer axels, otherwise 0
└ <code>trailerMaxLadenWeight</code>	1	Maximum permissible total weight of the trailer including payload in 10 kg units, rounded down / 0 = no trailer
└ <code>trailerWeightUnladen</code>	1	Trailer nominal weight empty in 10 kg units, rounded down / 0 = no trailer

Simplified trailer declaration:

The following table describes how the values for the simplified trailer declaration are to be assigned. The values `trailerMaxLadenWeight` and `trailerWeightUnladen` shall be set to 0 in any case. In case of simple trailer declaration, it does not matter if a present trailer is declared by a value 1 (trailer) or 2 (semitrailer) in `trailerType`.

Data element	Qty	Value range and description
<code>trailerCharacteristics</code>	1	
└ <code>trailerDetails</code>	1	
└ <code>trailerType</code>	1	0 = no trailer, 1 = trailer, 2 = semitrailer
└ <code>trailerAxles</code>	1	number of trailer axels, if no trailer = 0
└ <code>trailerMaxLadenWeight</code>	1	set to 0
└ <code>trailerWeightUnladen</code>	1	set to 0

2.3.2.6 VehicleLicencePlateNumber

The usage is according to EN 15509. Claimed licence plate number of the vehicle, the length of the padded LPN should be between 10 octets to 14 octets (i.e. 13 octets to 17 octets including the country code, alphabet indicator, length determinant and the LPN). A LPN, which is shorter than 10 characters, is padded with NUL characters so as to achieve a total of 10 characters.

For the LPN only Latin Alphabet No. 1 (according to ISO 8859-1) upper case letters and numbers shall be used.

Non Latin Alphabet No. 1 characters used in a LPN with the `latinAlphabetNo1` (i.e. characters from ISO 8859-2 Latin Alphabet No. 2 and ISO 8859-5 Latin/Cyrillic alphabet) shall be coded as lower case letters applying the translation table in Annex D of EN ISO 14906.

Data element	Definition	Length in octets
--------------	------------	------------------

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CountryCode	Two letter countryCode (ISO 3166-1-alpha-2 code) coded in ITA-2 alphabet acc. to EN 14816 Example: Country code = SE = 1010010000'B'	2
AlphabetIndicator	Alphabet indicator = LatinAlphabethNo1 = 000000'B	
Length determinant	Length determinant, example 10 octets = 0000 1010'B	1
LPN	Minimal 10 significant characters padded with NULL, max 14 characters Example = OCD560 = 4F 43 44 35 36 30 00 00 00 00'H	10 to 14
Total length		13 to 17

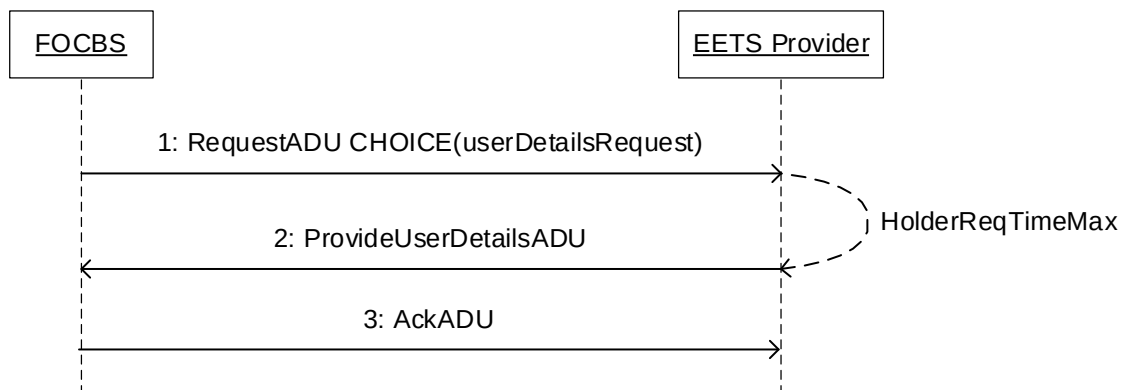
2.3.3 TollDeclarationADU error handling

At the present time, no error codes for the EETS journey declaration regarding business (content and logical) errors are sent by the FOCBS in an AckADU. There will be always an AckAdu according to section 2.9.1 with apduAckCode = apduOK (2).

2.4 Holder data

2.4.1 Transaction and requirements

In a holder data request one RequestADU will be transmitted in one InfoExchange. The following sequence diagram defines the data transmission for the request of the holder data:



The following conditions apply:

- Regardless of whether individual attributes or all attributes of the requested holder data are not available, the EETS provider shall respond with a ProvideUserDetailsADU.
- For each missing attribute in the ProvideUserDetailsADU, the userParameterStatus in UserParameterResponse shall then set to 1 (= attribute is not available).
- The EETS provider shall send the ProvideUserDetailsADU not later than 12 hours (= HolderReqTimeMax) after the request.

The FOCBS requests the holder data for every EETS journey with the RequestADU defined in section 2.4.2. The transmission of the holder data of the vehicle is carried out by the EETS provider in the data format according to section 2.4.3.

2.4.2 Holder data request (RequestADU)

With a RequestADU with CHOICE userDetailsRequest, the required holder data for a vehicle will be requested.

Data element	Qty	Value range and description
adu	1	
└ requestAdus		
└ └ userDetailsRequest	1	RequestADU with CHOICE userDetailsRequest
└ └ └ requestedADUType	1	provideUserDetailsADU
└ └ └ userId	1	
└ └ └ └ pan	1	
└ └ └ └ contractSerialNumber	0	
└ └ └ └ licencePlateNumber	0	
└ └ └ └ obeId	0	
└ └ └ listParametersRequested	2	The following 1 to 2 listed UserParameterRequest are requested.
└ └ └ └ UserParameterRequest		
└ └ └ └ └ extendedUserPostalAddress	1	(26)
└ └ └ └ └ preferredUserLanguage	1	(27)
└ └ └ userDetailsRequestReason	0	
└ └ └ userInfoValidityPeriod	1	Period is start date of the EETS journey
└ └ └ └ beginOfPeriod	1	Date/time for the validity of the requested details.
└ └ └ └ endOfPeriod	1	No period, same value as in beginOfPeriod

2.4.3 Holder data transmission (ProvideUserDetailsADU)

The answer to a holder data request shall provide the information valid at the date/time defined in userInfoValidityPeriod date element.

The transmitted data contain the details of the EETS User according to the Annex 1.

Data element	Qty	Value range and description
adu	1	
└ provideUserDetailsADU		
└ └ ProvideUserDetails	1	
└ └ └ originaluserIdRequest	1	
└ └ └ └ pan	1	
└ └ └ └ contractSerialNumber	0	
└ └ └ └ licencePlateNumber	0	
└ └ └ └ obeId	0	
└ └ └ userId	1	
└ └ └ └ pan	1	
└ └ └ └ contractSerialNumber	0	
└ └ └ └ licencePlateNumber	0	
└ └ └ └ obeId	0	
└ └ └ statusFlag	1	0...5 and 101 (Top-Up, range 0...7 in CEN/TS 16986:2016), see remark below.
└ └ └ listParameters	0 or 2	The following 2 listed UserParameterResponse have to be transmitted if statusFlag has a value from 1 to 5.
└ └ └ └ UserParameterResponse	1	
└ └ └ └ └ requestedUserParameter	0	
└ └ └ └ └ userParameterResponse	0..1	Present if userParameterStatus = 0 (attribute is available)
└ └ └ └ └ └ extendedUserPostalAddress	1	

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Data element	Qty	Value range and description
} addresseeRoleDescriptor	0	
} organisationName	0..1	Full company name, including its legal form (AG, GmbH, Ltd., etc.). This attribute shall be filled if the holder is a company.
} organisationUnit	0	
} function	0	
} formOfAddress	0	
} qualification	0	
} surname	0..1	This attributes shall be filled if the holder is a person.
} givenName	0..1	
} deliveryServicePoint	0..1	Shall contain, if present additional address information
} thoroughfare	1	Shall contain the street name and house number
} postcode	1	
} town	1	
} country	1	
} phoneInternationalDial...	0	
} phoneDiallingCode	0	
} mobileInternational...	0	
} mobileDiallingCode	0	
} mobileSubscriberNumber	0	
} faxInternationalDial...	0	
} faxDiallingCode...	0	
} faxSubscriberNumber...	0	
} email	0	
} userParameterStatus	1	0 = attribute is available, 1 = attribute is not available
} userInfoValidityPeriod	0	
} UserParameterResponse	1	
} requestedUserParameter	0	
} userParameterResponse	0..1	Present if userParameterStatus = 0 (attribute is available)
} } preferredUserLanguage	1	'de' 'fr' 'it' 'en' (language code according to ISO 639-1)
} userParameterStatus	1	0 = attribute is available, 1 = attribute is not available
} userInfoValidityPeriod	0	

Remark to the allowed statusFlag values:

- 0 = Means user unknown (noContractualRelation)
- 1 = Contract as private user (standardPrivateUserContract), userParameterResponse expected
- 2 = Contract as a commercial user (standardCommercialUserContract), userParameterResponse expected
- 3 = Put on black list, expect to remove it soon before the requested date/time (tempExceptionListed), userParameterResponse expected
- 4 = Put permanently on black list before the requested date/time (permanentExceptionListed), userParameterResponse expected
- 5 = Contract with the user has ended before the requested date/time (contract-Closed)

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101 = No user data available for the requested date/time (noDataAvailableForPeriod)

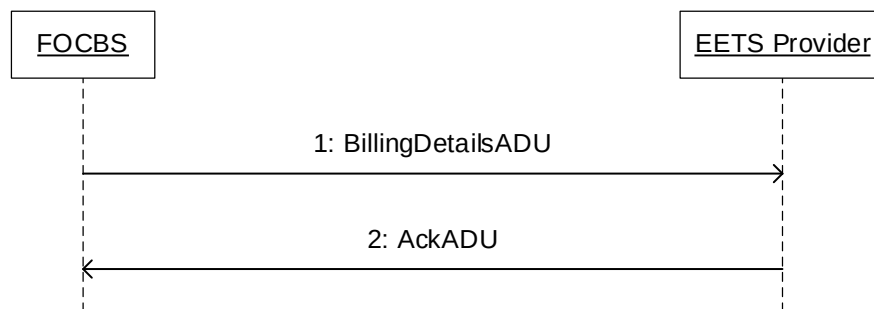
2.4.4 ProvideUserDetailsADU error handling

The FOCBS will not send any error message for this ADU and always send an AckADU according to section 2.9.1 with apduAckCode = apduOK (2).

2.5 Assessment and eVV

2.5.1 Transaction and requirements

The FOCBS transmits the assessment data, containing the performance-related heavy vehicle charge due for the EETS journey and the detailed charge-relevant factors of the journey, via the BillingDetailsADU (see section 2.5.2) to the EETS provider. The EETS provider shall confirm reception of the assessment data record with an AckADU.



For the language dependent texts in all data elements used for the BillingDetailsADU, the language used shall be in accordance with the answer in "preferredUserLanguage" of the holder data. In case there is no preferred language or it is none of the four supported languages (i.e. 'de' | 'fr' | 'it' | 'en') by the LSVA scheme, then "en" (English) shall be used.

2.5.2 BillingDetailsADU

Data element	Qty	Value range and description
adu	1	This ADU represents the eVV for an EETS journey. Only one ADU due to signature and archive reasons.
└ billingDetailsADU		
└ billingDetailsId	1	
└ issuerId	1	See apduOriginator in section 2.2.2
└ countryCode	1	CH, binary (10 Bits) = 0111000101'B
└ providerIdentifier	1	FOCBS = 1
└ billingDetailsNum	1	0 to 2 ⁶³ -1 according to CEN/TS 16986:2016
└ dateOfService	0	Not used according to CEN/TS 16986:2016
└ tollContext	1	See apduOriginator in section 2.2.2
└ countryCode	1	CH, binary (10 Bits) = 0111000101'B
└ providerIdentifier	1	FOCBS = 1
└ userId	1	
└ pan	1	
└ contractSerialNumber	0	
└ licencePlateNumber	1	
└ obeId	1	
└ relatedBillingDetails	0..1	Only present in case of refunds and subsequent payment for an earlier assessed EETS journey
└ issuerId	1	See apduOriginator in section 2.2.2
└ countryCode	1	CH, binary (10 Bits) = 0111000101'B

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Data element	Qty	Value range and description
^L providerIdentifier	1	FOCBS = 1
} billingDetailsNum	1	0 to 2 ⁶³ -1 according to CEN/TS 16986:2016 Contains the related billingDetailsNum
^L dateOfService	0	Not used according to CEN/TS 16986:2016
} period	1	Start and end of EETS journey
} beginOfPeriod	1	Date/time of CH entry (EETS journey start)
^L endOfPeriod	1	Date/time of CH exit (EETS journey end)
} billingDetailsAmount	1	Assessed LSVA amount (CHF)
} paymentFeeAmount	1	Amount in cents, 1 = 0.01 CHF (-2 ⁴⁹ to 2 ⁴⁹ -1)
} paymentFeeUnit	1	2756'H Currency in minor units of 100 :1 ('Rappen')
^L vATrate	0	Not used according to CEN/TS 16986:2016
} usageDetails	1	
} contextName	1	Constant value: "LSVA toll domain"
} appliedUserClass	1	Constant value: "Standard"
^L perDeclaredVehicleClasses	1..n	One element for each part of EETS journey with the same applicable tariff (no trailer status change)
} declaredVehicleClass	1	Assessed Euro class and assessed weight of the vehicle, see remark below.
^L perUsedTimeClasses	1	
} appliedTimeClass	1	Period from/to of EETS journey part with format: "DD:MM:YYYY hh:mm - DD:MM:YYYY hh:mm"
} costCenter	1	Mandatory according to CEN/TS 16986:2016, not used in LSVA toll context, empty string.
^L usageList	1	UsageList element according section 2.5.3
} refTollDeclaration	0..n	Reference to all declarations (TollDeclarationADU) of the assessed EETS journey, see remark below.
} issuerID	1	Configured and registered Provider-ID of the EETS provider
} countryCode	1	
^L providerIdentifier	1	
^L declarationId	1	declarationID of the related TollDeclarationADU
} associatedEventData	0	
} actionCode	1	Constant value 0 = send
^L paymentReference	0	

Remarks:

- The format of the assessed Euro class and assessed weight of the vehicle in the `declaredVehicleClass` UTF8String shall be according to the following definition
 "Euro e / tt'ttt kg" where
 e = Euro class 1 to 6, with option for Euro 5: "5 (EEV)"
 tt'ttt = Assessed weight of the vehicle train in kilogram
 Examples:
 "Euro 5 / 26'600 kg"
 "Euro 5 (EEV) / 40'000 kg"
- The data element `refTollDeclaration` is not present if there was no EETS journey declaration in time and the assessment was made at the discretion of the FOCBS (the vehicle was identified at one or more locations by the enforcement system in the LSVA toll domain).

2.5.3 UsageList

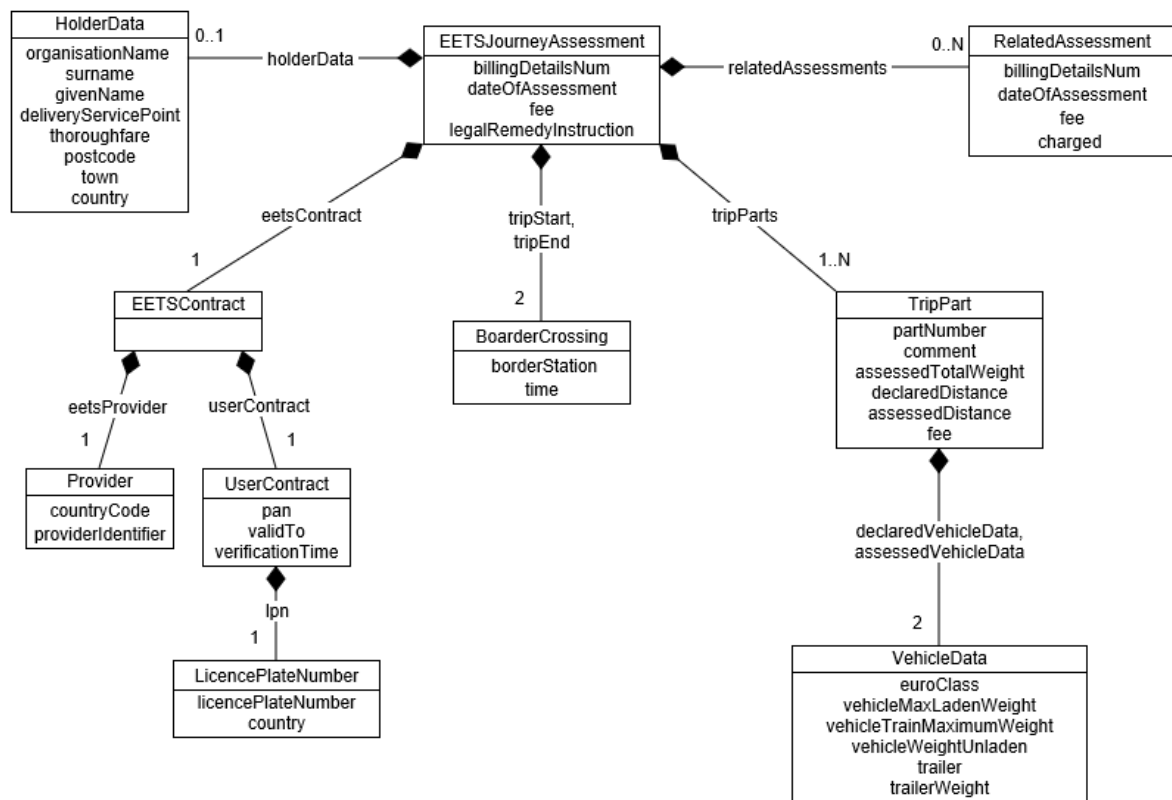
The data element `usageList` is defined below. The currency of the fee is in CHF.

Data element	Qty	Value range and description
UsageList	1	
└ usageListEntry	1	CHOICE freeTextDetail
└ └ freeTextDetail	1	
└ └ └ textLanguage	1	see preferredUserLanguage in 2.4.3: 'de' 'fr' 'it' 'en' (language code according to ISO 639-1)
└ └ └ textDetail	1	see 2.5.4 below
└ └ └ fee	1	Fee for this part of the EETS journey in CHF
└ └ └ └ paymentFeeAmount	1	Amount in cents 1 = 0.01 CHF (-2^49 to 2^49-1)
└ └ └ └ paymentFeeUnit	1	2756'H Currency in minor units of 100 :1 ('Rappen')
└ └ └ └ vATrate	0	Not used according to CEN/TS 16986:2016
└ └ └ feeQualifier	1	0 = standardCharge
└ includedDiscounts	0	
└ associatedEventData	0	
└ externalCosts	0	

2.5.4 textDetail

The **textDetail** of the first data element from the SEQUENCE of **perDeclaredVehicleClasses** in **billingDetailsADU** shall contain the assessment description (eVV) in extensible markup language (XML) of the whole EETS journey defined in this section. The **textDetail** of all other data elements from the SEQUENCE of **perDeclaredVehicleClasses** shall contain an empty string.

The overview of the XML structure for the assessment description is shown in the figure below:



The XML schema definition (XSD) for the assessment description is available: link to [EETS-Providers](#) – see "Documents".

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Remarks to the XML structure:

- The field <legalRemedyInstruction> (German "Rechtsmittelbelehrung") gives instruction on the right to appeal if the EETS user does not agree with the EETS journey assessment.
- The element <RelatedAssessment> is only present in case of an assessment correction as described in section 2.6.

The EETS journey assessment XML document shall be signed according to section 3.4. The signature can be verified with the XML document signature certificate defined in section 3.5.2.

The XML control characters of the signed EETS journey assessment XML document shall be escaped according to the table below (see <https://www.w3.org/TR/2008/REC-xml-20081126/#sec-predefined-ent>) before inserted in the `textDetail`.

Control character	Escape string
<	<
>	>
"	"
'	'
&	&

Remark:

- For verification of the signature, the XML control character escaping shall be undone.

2.5.5 BillingDetailsADU error handling

The following BillingDetailsADU specific error codes shall be sent in an AckADU according to section 2.9.2 by the EETS provider:

Name (AduReasonCode)	Meaning	Value
invalidADU	textDetail of first data element in the SEQUENCE of perDeclaredVehicleClasses (assessment description) is empty or the content is invalid	0
billingDetailsClaimIdRejected	BillingDetailsADU with corresponding Id already received	701
bilD-unknownDeclarationId	Reference to one or more declarations (TollDeclarationADU) are not known. Only allowed if one or more declarationId is referenced in BillingDetailsADU.	11001
bilD-unknownRelatedBillingDetails	Reference to the related billing details (BillingDetailsADU) is not known. Only in case of refunds or subsequent payment possible, see 2.6 below.	11002
bilD-invalidPan	Invalid/unknown PAN	11003
bilD-invalidObeld	Invalid/unknown OBE ID	11004
bilD-invalidLpn	Invalid/unknown vehicle registration number	11005

Remark:

- In case of a negative AckADU, an internal process for error analysing will be started. After error correction the BillingDetailsADU will be sent with a new `billingDetailsId` (= new `billingDetailsNum`).
- For each unknown reference to a TollDeclarationADU (`AduReasonCode` = `bilD-unknownDeclarationId`) an issue structure will be added to the list of issues in the AckADU. The unknown reference will be indicated with the `declarationId` in the attribute `issueLocation`.

2.6 Refunds and subsequent payment

The correction of an EETS journey assessment may result in a refund or subsequent payment. In such case a new BillingDetailsADU according to section 2.5.2 above shall be provided with the following different content:

- The additional data element `relatedBillingDetails` shall identify the corrected EETS journey assessment, i.e. the previous sent BillingDetailsADU.
- The data element `billingDetailsAmount->paymentFeeAmount` shall contain the amount of refund as negative value or subsequent payment as positive value.
- The data element `textDetail1` shall contain the assessment descriptions (eVV) with the content defined in section 2.5.4 including at least one RelatedAssessment.

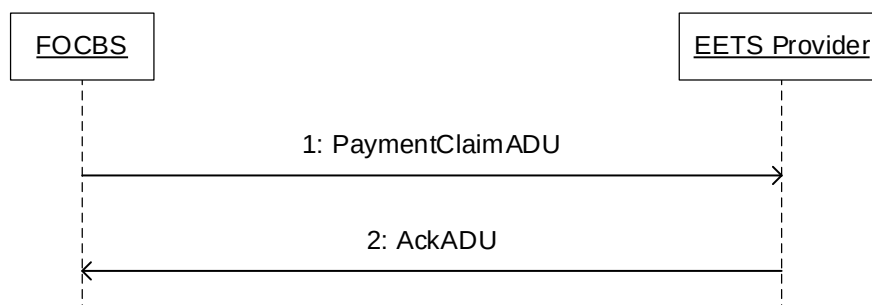
Remark:

- The amount in `billingDetailsAmount->paymentFeeAmount` shall be the difference of the two EETS journey assessments.

2.7 Payment claim

2.7.1 Transaction and requirements

The payment claim contains the summarised amount of and the reference to the BillingDetailsADUs (eVV) for an invoice period. The payment claim will be provided per calendar day to the EETS provider, even it is a payment claim without a `billingDetailsList` and `paymentFeeAmount` = 0.



The payment claim shall include all assessments, refunds and subsequent payments (all of type BillingDetailsADUs) provided to the EETS provider during the period defined by `startDateTime` and `endDateTime` of the PaymenClaimADU.

2.7.2 PaymentClaimADU

Data element	Qty	Value range and description
adu	1	
└ PaymentClaimADU		
└ paymentClaimId	1	0 to 2 ⁶³ -1, primary reference number for the payment system. Shall be unique independent of the receiving EETS provider.
└ startDateTime	1	date of claim day with time = 00:00:00
└ endDateTime	1	date of claim day with time = 23:59:59
└ userId	0	Top-Up, mandatory in CEN/TS 16986:2016, but the billingDetailsList refers to BillingDetailsADU for different userId
└ paymentClaimAmount	1	Summarised amount of the billingDetailsList in CHF
└ └ paymentFeeAmount	1	Amount in cents, 1 = 0.01 CHF (-2 ⁴⁹ to 2 ⁴⁹ -1)
└ └ paymentFeeUnit	1	2756'H Currency in minor units of 100 :1 ('Rappen')
└ └ vatRate	0	
└ paymentClaimStatus	1	0 = first version
└ typeOfFee	1	0 = toll
└ referenceDetailsList	1	SEQUENCE OF CHOICE billingDetailsList
└ └ billingDetailsList	0..n	SEQUENCE OF BillingDetailsId
└ └ └ issuerId	1	See apduOriginator in section 2.2.2
└ └ └ countryCode	1	CH, binary (10 Bits) = 0111000101'B
└ └ └ providerIdentifier	1	FOCBS = 1
└ └ billingDetailsNum	1	0 to 2 ⁶³ -1 according to CEN/TS 16986:2016
└ └ dateOfService	0	
└ actionCode	1	Constant value 0 = send
└ paymentReference	0	

Remark:

- An amendment version of a PaymentClaimADU is not foreseen, therefore the **paymentClaimStatus** has always the value 0 = first version.

2.7.3 PaymentClaimADU error handling

The following PaymentClaimADU specific error codes shall be sent in an AckADU according to section 2.9.2 by the EETS provider:

Name (AduReasonCode)	Meaning	Value
paymentClaimIdRejected	The id in the payment claim has been rejected	802
paC-wrongPaymentClaimAmount	The paymentClaimAmount is not the result of the sum from the billingDetailsList amounts.	11101
paC-unknownBillingDetails	One or more referenced billing details are unknown.	11102

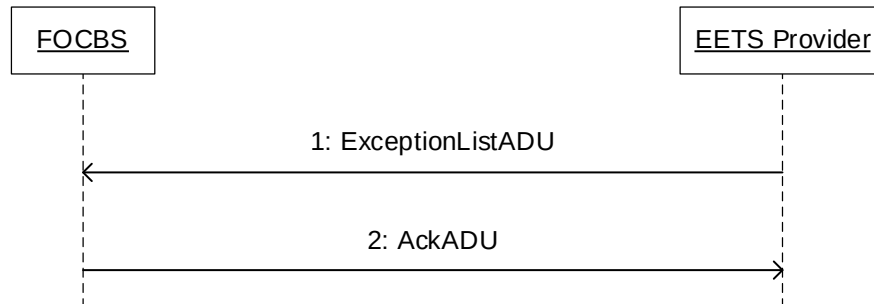
Remark:

- In case of a negative AckADU, an internal process for error analysing will be started. After error correction the PaymentClaimADU will be sent with a new **paymentClaimId**.
- For each unknown reference to a billing detail (AduReasonCode = paC-unknownBillingDetails) an issue structure will be added to the list of issues in the AckADU. The unknown reference will be indicated with the **billingDetailsNum** in the attribute **issueLocation**.

2.8 Exception list (white list)

2.8.1 Transaction and requirements

The EETS provider transmits up to 4 exception lists of the type white list to the FOCBS every day, so that these are activated at 05:00, 09:00, 13:00 and 17:00 Swiss local time. One of these 4 times shall be entered in `exceptionValidityStart`. The FOCBS only activates one exception list per activation time (date + time). The FOCBS will ignore a transmitted exception list if its activation time (date + time) is older than that of the currently active exception list. If no updated exception list is transmitted, the last successfully transmitted remains valid.



The submitted exception list of type "white list" contains only white list entries and thus no black list entries. Each entry in the exception list consists of a PAN, a vehicle registration number and the EETS OBE device number.

A transmitted exception list always contains all entries and completely replaces the previously transmitted list. This means that no partial updates are allowed.

2.8.2 ExceptionListADU

Data element	Qty	Value range and description
adu └ exceptionListADUs └ ExceptionListADU	1	
└ exceptionListVersion	1	Shall be greater than or equal to the previous exception-list version (0 to 2 ⁶³ -1)
└ exceptionListType	1	2 = white list, list of vehicles with a valid EETS contract for the LSVA toll domain (list of vehicles for which TSP accepts responsibility)
└ exceptionValidityStart	1	Activation date and time
└ exceptionValidityEnd	0	
└ exceptionListEntries └ ExceptionListEntry	0..n	0 = empty list, all entries deleted
└ └ userId	1	
└ └ └ pan	1	Personal account number, the primary user identifier in the EETS provider interface
└ └ └ contractSerialNumber	0	
└ └ └ licencePlateNumber	1	Unique vehicle identification Format and restrictions as defined in 2.3.2.6 VehicleLicencePlateNumber
└ └ └ obeId	1	Optional according to CEN/TS 16986:2016
└ └ statusType	1	0 or 3
└ └ reasonCode	1	8 = whiteListedUser
└ └ entryValidityStart	1	Mandatory according to CEN/TS 16986:2016.

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entryValidityEnd	0	Not used according to CEN/TS 16986:2016
vehicleParameters	0	Optional according to CEN/TS 16986:2016
actionRequested	1	3 = acceptOBE
efcContextMark	0	
vatId	0	

2.8.3 ExceptionListADU error handling

An exception list with one or more incorrect entries is not accepted and an AckADU with apduAckCode = apduNotOK (3) is sent to the EETS provider. In this case the EETS provider should resend a corrected exception list as soon as possible.

The following ExceptionListADU specific error codes shall be sent in an AckADU according to section 2.9.2 by the FOCBS. For each erroneous **ExceptionListEntry** an issue structure will be added to the list of issues. The erroneous **ExceptionListEntry** will be indicated with the list index (0 ... n) in the attribute **issueLocation**.

Name (AduReasonCode)	Meaning	Value
exL- exemptionListWithWrongActivationTime	The time in exceptionValidityStart is not one of the 4 allowed activation times.	10313
exL-expiredActivationDateAndTime	The latest transmission date and time has expired	10314
exL- exemptionListWithActivation- TimeMultiplied	The whitelist with this exceptionValidityStart is already processed.	10315

2.9 Confirmation and error messages (ackADU)

2.9.1 APDU confirmation and error message

The following message defines the response to an ADU transmission:

Data element	Qty	Value range and description
adu └ ackADU	1	
apduIdentifier	1	0 to 2 ⁶³ -1 - shall indicate the identifier of the APDU containing the data structure(s) being acknowledged
explicitlyAkedAdus	0	
apduAckCode	1	Codes 2, 7 and 8 according to 2.9.3
apduAckText	0	
issues	0	

2.9.2 ADU error messages

The following AckADU is used if an ADU in the infoExchange is not OK and has one or more issues.

Data element	Qty	Value range and description
adu └ ackADU	1	
apduIdentifier	1	0 to 2 ⁶³ -1 - shall indicate the identifier of the APDU containing the data structure(s) being acknowledged

Data element	Qty	Value range and description
explicitlyAckedAdus	0	Not used according to CEN/TS 16986:2016
apduAckCode	1	3 = apduNotOK
apduAckText	0	Not used according to CEN/TS 16986:2016
└ issues	1..n	List of the ADUs having one or more issues. An ADU is listed for each issue occurring to it.
issueADUstruct	1	0 = constant value, see remark below
issueLocation	0..1	Top-Up: Shall be present only in case of AckADU for - BillingDetailsADU see section 2.5.5 - PaimentClaimADU see Section 2.7.3 2.8.3
issueContent	0	
issueCode	1	Issue codes according to ADU specific error handling
issueText	0	
└ issueUsers	0	

Remark:

- In most cases only one ADU will be included in an APDU. Therefore the attribute `issueADUstruct` shall contain the constant value 0.

2.9.3 ApduReasonCode (apduAckCode)

The following table contains the allowed ApduReasonCode from EN ISO 12855:2015 and CEN/TS 16986:2016:

Name	Meaning	Value	Source
apduOK	APDU was accepted	2	EN ISO 12855
apduNotOK	APDU rejected	3	EN ISO 12855
originatorRejected	APDU rejected because Apdu Originator not known or no valid contract exists	7	CEN/TS 16986
recipientUnknown	APDU rejected because Information Recipient not known (or no valid contract exists)	8	CEN/TS 16986

3 Transport layer

3.1 EETS Service Location

The URL to the FOCBS EETS service shall be published on the FOCBS webpage, link to [EETS-Providers](#) – see "Documents".

3.2 ASN.1 encoding

The XML Encoding Rules (XER) according to ISO/IEC 8825-4 shall be used to encode the ASN.1 InfoExchange data.

3.3 Transport security

The exchange of the InfoExchange messages shall be done using the Transport Layer Security, TLS 1.2 protocol. The identity of the EETS provider shall be validated using a client certificate.

3.4 Data integrity

The XML payload InfoExchange shall be signed by its originator.

In addition, the EETSJourneyAssessment (eVV) defined in section 2.5.4 shall be signed by the FOCBS.

The digital signatures of the InfoExchange and the EETSJourneyAssessment shall be according to the W3C standard "XML Signature Syntax and Processing Version 1.1" (W3C Recommendation 11 April 2013, <https://www.w3.org/TR/2013/REC-xmlsig-core1-20130411>). From that standard the following options shall be used:

- Canonicalization of the XML document, Identifier for canonical XML 1.0 (omits comments): <https://www.w3.org/TR/2002/REC-xml-exc-c14n-20020718>
- Signature with envelope, Identifier: <http://www.w3.org/2000/09/xmlsig#enveloped-signature>
The signature element will be inserted inside the content (i.e. InfoExchange) that it is signing:

```
<InfoExchange>  
  <InfoExchangeContent>  
  </InfoExchangeContent>  
  <Signature>  
    <SignedInfo>...</SignedInfo>  
    <SignatureValue>...</SignatureValue>  
    <KeyInfo>...</KeyInfo>  
  </Signature>  
</InfoExchange>
```
- For the <KeyInfo> element, the option <X509Data> (Identifier <http://www.w3.org/2000/09/xmlsig#X509Data>) with exactly one attribute of type <X509SubjectName> and <X509Certificate>
- Signature algorithm PKCS#1 v1.5 with digest sha256, identifier: <http://www.w3.org/2001/04/xmlsig-more#rsa-sha256>

3.5 Certificates

3.5.1 General

The used certificates shall be according X.509. The length of the RSA keys in the X.509 certificates shall be 2048 bits.

3.5.2 FOCBS

The TLS server certificate will be provided to the EETS provider during TLS handshake.

The currently used FOCBS XML document signature certificate shall be published on the FOCBS webpage, link to [EETS-Providers](#) – see "Documents".

3.5.3 EETS provider

3.5.3.1 TLS Client Certificate

The EETS-Provider shall provide a certificate signing request (CSR) to the FOCBS. Once the CSR is validated and signed by the FOCBS, the certificate and its chain will be returned to the EETS provider. This certificate shall be used by the EETS Provider to estab-

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lish the connection to the FOCBS EETS system. The CSR should contain the following attributes:

```
CN: eets-pis-<providerName>.ezv.admin.ch
OU: EZV EETS
O: Admin
C: CH
```

3.5.3.2 Signing key

The EETS provider shall provide the FOCBS with the necessary information to validate the message signatures. This can either be in the form of a public key or a certificate of his choice.

The EETS provider is responsible for notifying the FOCBS if the security of one of the certificates can no longer be guaranteed or if he wants to renew his signing key.

3.6 Transport API

The exchange of InfoExchange messages in both directions is done using the HTTPS protocol. This section introduces the basic concept of the API. A detailed technical specification is available as [Open API](#) specification: link to [EETS-Providers](#) – see "Documents".

3.6.1 Sending Messages to FOCBS

An EETS provider shall send an InfoExchange message using the **SendMessage** operation.

Verb	PUT	
Path	/api/messages/toFCA/{countryCode}/{providerIdentifier}/{messageId}	
Parameters	countryCode	Configured and registered Provider-ID of the communication channel for this provider.
	providerIdentifier	
	messageId	Unique messageId, see Idempotence
Body	XER encoded, signed InfoExchange Maximum size 10MB	

In case the Message is successfully received and stored by the FOCBS, the request will be answered with HTTP (200).

Remarks:

- This operation is **idempotent**. This means in case of timeout the EETS provider can safely repeat the operation, using exactly the same messageId, until the operation is successful.
- Replacing of a messages is not supported. FOCBS will always use the first message successfully received for the messageId specified.

3.6.2 Receiving Messages from FOCBS

The EETS provider has to poll messages from the FOCBS system. The API to poll messages from the FOCBS system consists of three operations:

ListMessages	Get a list of all messages waiting to be read
GetMessage	Receive one message
ConfirmReceipt	Confirm receipt of one message

3.6.2.1 ListMessages

To get a list of the messages to be read (receipt not yet confirmed) the EETS provider shall use the ListMessages operation.

Verb	GET	
Path	/api/messages/fromFCA/{countryCode}/{providerIdentifier}	
Parameters	countryCode	Configured and registered Provider-ID of the communication channel for this provider.
	providerIdentifier	

The response body is a JSON document listing all pending messages. For each message three attributes are provided:

messageId	The unique id of the message (UUID) needed to reference this message
aduType	The ADU Type of the message, one of - AckADU - RequestADU - BillingDetailsADU - PaymentClaimADU
published	Date/Time of publication

3.6.2.2 GetMessage

To download a message, the GetMessage operation shall be used.

Verb	GET	
Path	/api/messages/fromFCA/{countryCode}/{providerIdentifier}{messageId}	
Parameters	countryCode	Configured and registered Provider-ID of the communication channel for this provider.
	providerIdentifier	
	messageId	The messageId

Remark:

- Downloading a message does not remove the message from the list of messages.

3.6.2.3 ConfirmReceipt

To remove a message from the list of messages after successful download, the ConfirmReceipt operation shall be used.

Verb	DELETE	
Path	/api/messages/fromFCA/{countryCode}/{providerIdentifier}{messageId}	
Parameters	countryCode	Configured and registered Provider-ID of the communication channel for this provider.
	providerIdentifier	
	messageId	The messageId

Remark:

- This technical message confirmation is related to the transport layer and has no impact on business processes. Receipt of an ADU, relevant for business processes, is confirmed by sending an AckADU.

3.7 Data transfer

3.7.1 Limitations

The EETS provider may utilize a maximum of three concurrent operations to send messages to the FOCBS. One additional operation may be performed to receive messages from the FOCBS.

3.7.2 Recommendations

The FOCBS recommends to send an EETS journey declaration in a short time after the vehicle has left the LSVA toll domain. In addition, the FOCBS recommends sending and getting messages to and from the FOCBS during the whole day (not only once a day as a batch job).

Depending on the workload, the FOCBS system will process and reply to a message from the EETS provider as quickly as possible. A quick EETS journey declaration and fast reply to the holder data request decreases the delivery time of the assessment data and eVV (BillingDetails) to the EETS provider.