Austrian HGV Tolling System

EETS DSRC Tolling Data Specification

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[EETS_data]	V4.0	released	public	19.10.2021

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Abbreviations and Glossary

Abbreviation, Term	Description
CI	Contract Issuer (= EETS Provider)
DSRC	Dedicated Short Range Communication
EETS	European Electronic Toll Service
EFC	Electronic Fee Collection
EID	Element Identifier
EN	European standards
HGV	Heavy Goods Vehicle
ISO	International Organization for Standardization
ISO/DIS	ISO Draft International Standard
LPN	License Plate Number
MSB	Most Significant Bit
OBE	On-Board Equipment (= OBU)
OBU	On-Board Unit (= OBE)
PAN	Personal Account Number
RSE	Road Side Equipment
TC	Toll Charger
TSP	Toll Service Provider = Contract Issuer (CI) = EETS Provider
UI	User Interface (= MMI)
VST	Vehicle Service Table

References

All references are listed in Annex A - References of this document. For dated references, subsequent amendments to or revisions of any of these publications apply only when incorporated in it by amendment or revision. For undated references, the latest edition of the referenced publication applies.

1 Introduction

This document specifies in detail data content and use of this data within an EETS transaction at ASFINAG RSE. All attributes and function names in this document are named according to [EFC API].

1.1 OBE application element contents

Attributes (EID>0)	AttrId	Type	Length in Bytes	Read	Write	Remarks
CONTRACT						Information associated with the service rights of the Contract Provider (EETS Provider)
EFC-ContextMark	0	32	6	Yes	No	Contains the Contract Provider Identification. Transmitted as part of the VST.
PAYMENT						Data associated with the Payment transaction.
PaymentMeans (including PAN)	32	64	14	Yes	No	Includes: - The Personal Account Number, including the Payment Means Issuer (identified by the IIN), - The PAN Expiry Date - The payment means Usage Control
VEHICLE						Information pertaining to the identification and characteristics of the vehicle.
VehicleLicencePlateNumber	16	47	Variable (10…14) + 3	Yes	No	Length of the attribute, incl. Country code, Alphabet Indicator and length. (see Note 1)
VehicleClass	17	49	1	Yes	No	
VehicleDimensions	18	50	3	Yes	No	not used
VehicleAxles	19	51	2	Yes	No	
VehicleWeightLimits	20	52	6	Yes	No	not used
VehicleSpecificCharacteristics	22	54	4	Yes	No	
EQUIPMENT						Information pertaining to the OBE.
EquipmentOBEId	24	56	5 (=4+1)	Yes	No	Length of EquipmentOBEId is fixed to 4+1 bytes as specified in [IAP]
EquipmentStatus	26	58	2	Yes	Yes	Includes transaction counter and black list flag
RECEIPT						
ReceiptData1 (last)	33	65	28	Yes	Yes	
ReceiptData2 (penultimate)	34	66	28	Yes	Yes	

Table 1: EETS OBE application element contents

Note 1: According to EN 15509:2007 the length of this attribute was fixed to 14 + 3 = 17 bytes, in more recent versions of EN 15509 variable length (13 .. 17 bytes) is allowed. Though the

RSE can read LPN information with a length of 10 to 14 characters, only the first 10 significant characters are processed in the central systems.

Note 2: Implementation of additional attributes for compatibility reasons to other existing systems (like AttrId. 4 and 23) is up to the EETS Provider.

“Read” and “Write” define access rights to a given attribute for GET, GET_STAMPED or SET used by RSE.

Each Attribute contains one or several data elements according to [EFC API].

2 Attribute data

For additional information to the attributes see [EFC API], chapter “8 EFC Attributes”.

2.1 Attribute 0: EFC Context Mark

The **EFC-ContextMark** denotes a specific EFC context in the OBE, comprising the organization that issued the contract, the type of contract and the context version. EFC-ContextMark data is transmitted in the VST as part of the ApplicationContextMark to enable the RSE to select the suitable EFC application as well the appropriate OBE data element, if the OBE is presenting more data elements.

Data element	Definition	Use in ASFINAG context
ContractProvider	Identifies the organization that issued the service rights given in the Contract, i.e. the EETS Provider. Numbers shall be assigned on a national basis. See [AVI No register]	mandatory
TypeOfContract	ContractProvider-specific designation of the rules that apply to the Contract. Allows, e.g., for the determination of the tariff or designating the type of purse associated with the contract.	mandatory
ContextVersion	ContextVersion denotes the implementation version of the concerned contract within the context of the given ContractProvider, value assigned at the discretion of the ContractProvider. The ContextVersion may also be used as a security key reference.	mandatory

Table 2: Attribute 0: EFC Context Mark - Data Elements

2.2 Attribute 32: Payment Means

The attribute PaymentMeans holds the contract data PAN (personal account number), the expiry date and the usage control of the contract:

Data element	Definition	Use in ASFINAG context
PersonalAccountNumber (PAN)	Coded according to financial institutions, consists of the Major Industry Identifier (MII), the Issuer Identifier Number (IIN, including the MII), the account number and a check digit (calculated with the Luhn algorithm).; according to ISO 7812	mandatory
PaymentMeansExpiryDate	Expiring date of payment means. Payment means expires at 24h of paymentMeans ExpiryDate. Value assigned at the discretion of the ContractProvider.	mandatory
PaymentMeansUsageControl	Indicates issuer's specified restrictions on the geographic usage and services allowed for the applications	not used

Table 3: Attribute 32: Payment Means - Data Elements

2.3 Attribute 16: Vehicle License Plate Number

This attribute is holding information about the vehicles license plate content (LPN) and the registering country. The license plate information can have up to 14 characters according to [IAP], but for legacy and compatibility reasons only up to 10 characters can be used for identification in the ASFINAG toll context. The license plate information shall always be padded with NULL characters after the last character to achieve the total length indicated by the length determinant.

For the LPN only Latin Alphabet No. 1 (according to ISO 8859-1) upper case letters and numbers (without any spaces and hyphens) shall be used in the ASFINAG toll context. Please note, that further restrictions for use of Latin-1 characters apply according to restrictions for LPN data in EasyGo HGV files (see EasyGO document 203 "Technical requirements, data formats and interface specifications").

Non Latin Alphabet No. 1 characters used in a LPN (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 from Annex D of [EFC API].

Data element	Definition	Use in ASFINAG context
CountryCode	Two letter country code (ISO 3166-1-alpha-2 code), coded in ITA-2 alphabet according to EN ISO14816 [AVI No].	mandatory
AlphabetIndicator	Only value for latinAlphabetNo1 allowed	mandatory
Length determinant	10 to 14	mandatory
LPN	Up to 10 significant characters	mandatory

Table 4: Attribute 16: Vehicle License Plate Number - Data Elements

2.4 Attribute 17: Vehicle Class

The attribute VehicleClass is holding information about trailer presence, the vehicles Harmonized European Vehicle Class and a local class, if defined by the EETS Provider.
The VehicleClass according to [IAP] has the bit ordered substructure TCCC LLLL, where:

T	…	Trailer Indicator
CCC	…	European Vehicle Group
LLLL	…	Local Vehicle Classes

The data element Trailer Indicator (T) is used to indicate whether the vehicle is towing a trailer (Trailer not present = 0, trailer present= 1).
The value of Trailer Indicator (T) shall be always 1, if the value of VehicleAxlesNumber.NumberOfAxles.Trailer > 0

The data element European Vehicle Group (CCC) is based on UNECE Vehicle Classes (Harmonized European Vehicle Classes).

European Vehicle Group	Description	Characteristics	UNECE Class
0 (000 b)	no entry		L
1 (001 b)	small passenger vehicles	seats ≤ 8+driver	M_1 (see Note 1)
2 (010 b)	light goods vehicles	weight < 3.5 t	N_1 (see Note 2)
3 (011 b)	**large passenger vehicles**	**seats > 8 + driver**	**M_2, M_3 (see Note 3)**
4 (100 b)	**heavy goods vehicles (up to 12 t)**	**weight > 3.5 t and ≤ 12 t**	**N_2**
5 (101 b)	**heavy goods vehicles (over 12 t)**	**weight > 12 t**	**N_3**
6 (110 b)	motorcycles		L
7 (111 b)	**other vehicles**	**weight > 3.5 t**	**see Note 4**

Table 5: Attribute 17: Vehicle Class – Mapping between data element European Vehicle Group and UNECE Vehicle Class

Note 1: Assumed to be ≤ 3.5 tons, otherwise assigned to group 7.
Mobile homes with weight > 3.5 t shall be assigned to group 3.

Note 2: Assumed to have 2 axles, otherwise the vehicle is assigned to group 7.

Note 3: Note that a few of these vehicles may be ≤ 3.5 tons.

Note 4: Any vehicle not defined in European Vehicle Groups 0-5.
This includes small passenger vehicles weighing more than 3.5 tons.

Note 5: In former versions of [IAP] the meaning for European Vehicle Group values 0 and 6 was swapped, but this is not relevant for HGV tolling in Austria.

The data element European Vehicle Group is used to distinguish between trucks, busses (both > 3.5 t) and other vehicles. Vehicles in European Vehicle Groups 3, 4, 5 and 7 are considered to be “heavy vehicles” in terms of the EETS (weighing more than 3.5 tons); they are relevant for the tolling system in Austria.

Data element	Definition	Use in ASFINAG context
T Trailer Indicator	Trailer no/yes	mandatory
CCC European Vehicle Group	European vehicle group based on UNECE	mandatory
LLLL Local Vehicle Class	Local vehicle class, defined by the SP	not used

Table 6: Attribute 17: Vehicle Class - Data Elements

2.5 Attribute 18: Vehicle Dimensions

The attribute VehicleDimensions is holding information about the nominal overall dimensions of the vehicle according to ISO 612.

Data element	Definition	Use in ASFINAG context
VehicleLengthOverall	Nominal maximum overall length of the vehicle according to ISO 612, in dm, rounded to the next dm.	not used
VehicleHeightOverall	Nominal overall unladen height, according to ISO 612, in dm, rounded to the next dm.	not used
VehicleWidthOverall	Nominal overall width, according to ISO 612, in dm, rounded to the next dm	not used

Table 7: Attribute 18: Vehicle Dimensions - Data Elements

The attribute VehicleDimensions is not used in the ASFINAG context.

2.6 Attribute 19: Vehicle Axles

The attribute VehicleAxles is holding information about the first axle height, the usage of dual tyre and the number of axles (including drop axles) for tractor vehicle and trailer.

Data element	Definition	Use in ASFINAG context
VehicleFirstAxleHeight	Bonnet height, measured over the front axle, in dm, rounded to the next dm	not used
VehicleAxlesNumber	VehicleAxlesNumber.TyreType: Claimed tyre type	not used
VehicleAxlesNumber	VehicleAxlesNumber.NumberOfAxles.Trailer: number of axles on trailer including drop axles	mandatory

VehicleAxlesNumber	VehicleAxlesNumber. NumberOfAxles.Tractor: number of axles of the tractor unit including drop axles	mandatory

Table 8: Attribute 19: Vehicle Axles - Data Elements

Note: The tariff relevant vehicle classification in Austria is based on the number of axles of the complete HGV combination (tractor and trailer). There is class 2, 3 and 4+ corresponding to the sum of all axles (4 and more axles give class 4+). For a bus (European vehicle Class 3) the axles of a trailer will not be counted for the tariff relevant vehicle classification.

If the OBE allows to manually declare trailer axles, VehicleAxlesNumber.NumberOfAxles.Trailer shall be set to 0 at initial personalization; VehicleAxlesNumber.NumberOfAxles.Trailer will be automatically set by the OBE logic, if additional axles are declared.

If not agreed otherwise, VehicleAxlesNumber.NumberOfAxles.Tractor shall be set to values 2, 3, 4 only at personalization (Value 4 will be interpreted as “4 or more” axles at the tractor vehicle).

2.7 Attribute 20: Vehicle Weight Limits

The attribute VehicleWeightLimits is holding information about vehicle weight limits according to ISO 1176.

Data element	Definition	Use in ASFINAG context
VehicleMaxLadenWeight	Maximum permissible total weight including payload, according to ISO 1176. 10 kg units, rounded down to the next 10 kg step.	not used
VehicleTrainMaximumWeight	Maximum permissible weight of the complete vehicle train, as defined in ISO 1176. 10 kg units, rounded down to the next 10 kg step.	not used
VehicleWeightUnladen	Nominal unladen weight, according to ISO 1176 in 10 kg units, rounded down to the next 10 kg step.	not used

Table 9: Attribute 20: Vehicle Weight Limits - Data Elements

The attributes VehicleWeightLimits is not used in the ASFINAG context.

2.8 Attribute 22: Vehicle Specific Characteristics

The attribute VehicleSpecificCharacteristics is holding information about environmental characteristic (emission class), engine type and other vehicle characteristics.

Data element	Definition	Use in ASFINAG context
EnvironmentalCharacteristics. EuroValue	Euro value as defined in EC directive 88/77/EEC and consecutive amendments	mandatory
EnvironmentalCharacteristics. CopValue	Cop value as defined in EC directive 2003/127/EEC.	not used
EngineCharacteristics	Claimed engine type	mandatory
DescriptiveCharacteristics	Vehicle shapes for silhouette	not used
FutureCharacteristics	Reserved for future use	not used

Table 10:Attribute 21: Vehicle Specific Characteristics - Data Elements

In the ASFINAG context the data elements EngineCharacteristics and EnvironmentalCharacteristics.EuroValue are interpreted for tariff calculation.

2.8.1 Data Element EngineCharacteristics

In the ASFINAG context the data element EngineCharacteristics is used to determine the type of engine of a vehicle.
Coding of VehicleSpecificCharacteristics.EngineCharacteristics is according to [EFC API].

2.8.2 Data Element EnvironmentalCharacteristics.EuroValue

In the ASFINAG context the data element EnvironmentalCharacteristics.EuroValue is used to determine the EURO Emission Class.
Coding of VehicleSpecificCharacteristics.EnvironmentalCharacteristics.EuroValue:

The EURO emission class is to be coded 1:1 as value to this data field, for EEV classified vehicles value 15 shall be used.

Note: "Enhanced environmentally friendly vehicle" or EEV is a term used in the European emission standards for the definition of a "clean vehicle" > 3.5 tons.

2.9 Attribute 24: Equipment OBU Id

The EquipmentOBUId shall be a unique identification number for given manufacturer (identified by the ManufacturerId in VST) assigned to OBE by the manufacturer during the production process.

Data element	Definition	Use in ASFINAG context
EquipmentOBUId	Coding and personalization by the manufacturer	mandatory

Table 11:Attribute 24: Equipment OBU Id - Data Elements

The EquipmentOBUId is used to identify a specific OBE together with the ManufacturerId (submitted in VST) and *EFC-ContextMark.ContractProvider* e.g. for blacklisting purposes.

2.10 Attribute 26: Equipment Status

The attribute EquipmentStatus is holding EFC application related information pertaining to the status of the equipment.
The coding of EquipmentStatus has the bit ordered substructure:

LBLL CCCC CCCC CCCC

where:

LBLL … Local use (4 bits), coding and use at the discretion of the toll charger. Bit B of those 4 bits can be used for blacklisting purposes (“Blacklist Bit”).

CCCC CCCC CCCC … sequential transaction counter (12 bits); it is updated by the RSE according to chapter 6.2.5.2 of [IAP].

Data element	Definition	Use in ASFINAG context
LBLL Blacklist Bits	If the Blacklist Bit is used (B = 1), the OBE can be treated as blacklisted (see Note 1)	optional (or set to zero)
CCCC CCCC CCCC Transaction Counter	Set to zero at initial personalization (see Note 2)	mandatory

Table 12: Attribute 26: Equipment Status - Data Elements

Note 1: Setting or resetting the Blacklist Bit is reserved to the EETS Provider. Anyway, if the Blacklist Bit B is set, the OBE is treated as being on the blacklist if not otherwise agreed (configurable at the RSE for each EFC Context Mark).

Note 2: Due to the limited benefit of the transaction counter of an OBE operating in different toll domains, there is no automated interpretation of the transaction counter in the Austrian RSE activated.

2.11 Attribute 33: Receipt Data 1

The attribute ReceiptData1 contains information associated with the last transaction according to [EFC API]. This attribute is written by RSE only; initial personalization shall be done with zeros. It is used for enforcement purposes at the ASFINAG toll domain.

2.12 Attribute 34: Receipt Data 2

The attribute ReceiptData2 contains information associated with the penultimate transaction according to [EFC API]. This attribute is written by RSE only; initial personalization shall be done with zeros. It is used for enforcement purposes at the ASFINAG toll domain.

3 Operating and configuration parameters

3.1 ManufacturerId and EquipmentClass

Manufacturer identifier (ManufacturerId) and EquipmentClass is written by the manufacturer on the OBE. This information is submitted in the VST and can be used at RSE e.g. to select transaction operating parameters necessary for this OBE.

Data element	Definition	Used in context
ManufacturerId	Value assignments see [AVI No register].	mandatory
EquipmentClass	Shall be used to show different OBE models / versions from the same manufacturer, i.e. the combination ManufacturerId / EquipmentClass must be unique for a given OBU model and its versions	mandatory

Table 13:ManufacturerId and EquipmentClass

3.2 Differentiation of OBU models or versions of the same manufacturer in EFCContextMark

To enable transaction based OBU quality evaluation in systems where the EquipmentClass cannot be used to distinguish different OBU models or OBU versions with the same ManufacturerId, for a given TSP (EFCContextMark.ContractProvider) it is mandatory to vary EFCContextMark.TypeOfContract and / or EFCContextMark.ContextVersion. The keyset used may remain the same.

3.3 SetMMI

Due to ambiguities in previous versions of [EFC API] different values for the SetMMI container can be used for older OBE models.

The Austrian RSE will use Container type (choice) = 69 (decimal) if not otherwise agreed (configurable at RSE).

3.4 Security features

3.4.1 Use of Access Credentials

In the ASFINAG EETS toll context the use of security level 1 (= use of Access Credentials) is mandatory.

3.4.2 Key References

The index address range for the 8 authenticator keys and the current used keys (for the Issuer / TSP authenticator and the Operator / TC authenticator) is configurable at the RSE for each EFC Context Mark as defined in [EFC API].

The following key ranges are mandatory to be used for the ASFINAG EETS toll context:

EETS Provider Authenticator (Issuer / TSP authenticator), KeyRef is 111 to 114.
The authenticator value calculated by use of the specified KeyRef is transmitted to the TSP together with the other transaction data.

Operator Authenticator (TC authenticator), KeyRef is 115 to 118.
This authenticator is calculated and checked for correctness during the transaction at the roadside.

4 Annex A - References

Reference	Document Ref	Date / Version	Document title
[EETS_acc]			EETS Acceptance Procedures
[EETS_DSRC]			EETS-DSRC Transaction for Tolling and Enforcement
[EETS_data]			EETS DSRC Data Specification (this document)
[EETS_OBE-req]			EETS-OBE Requirements Specification (For use of this document in connection with other (non- EETS) projects, the respective document about OBE requirements will apply)
[IAP]	EN 15509	2014	Road Traffic and Transport Telematics (RTTT) – Electronic Fee Collection –Interoperability application profile for DSRC
[EFC API]	EN ISO 14906:2018/ Amd1:2020	2018/ Amd1:2020	Road Traffic and Transport Telematics (RTTT) – Electronic Fee Collection – Application interface definition for dedicated short range communication
[AVI No]	EN ISO 14816	2005	Road Traffic and Transport Telematics (RTTT) – Automatic Vehicle and Equipment Identification – Numbering and Data Structures
[AVI No register]			https://www.itsstandards.eu/registries/ (link valid at 01.04.2021)
[EasyGo-203]			EasyGO document 203 “Technical requirements, data formats and interface specifications”

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