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**AP-1.6A**

**AutoPASS OBE Statement of Compliance**

**to**

**Requirements for On-board Equipment (OBE) for use in AutoPASS Samvirke,**

**Functional and Technical requirements**

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# Definitions, Abbreviations and references

The Terms and definitions used in this document are defined in:

**AutoPASS Requirement specification:** AP-1.0 - Definisjoner, Standarder og Direktiver (ref. [1])

# Preface

This signed document is a statement of compliance to the spesifications stated in document AP-1.6 “Requirements for On-board Equipment (OBE) for use in AutoPASS Samvirke” v2.01

This statement of compliance is valid for the following OBE:

|  |  |  |  |
| --- | --- | --- | --- |
| **Client (TSP)** | **Manufacturer** | **OBE Model (HW)** | **OBE Specification** |
|  |  |  |  |
|  |  |  |  |

#### Document date:

#### Signed by:

# references

The following AutoPASS documents are referenced in this document:

|  |  |  |
| --- | --- | --- |
| **Ref.** | **Document name** | **Description** |
|  | AP-1.0 AutoPASS\_Definisjoner, Standarder og Direktiver | The standards and directives referenced within this document are described with full titles in thus reference. Whenever a standard is referenced it is referring to the latest version of the standard. |
|  | AP-1.6 Requirements for Onboard Equipment (OBE) for use in AutoPASS Samvirke | Functional and Technical requirements for OBE approval |

# Compliance Statement

The following chapters contain the compliance statements for each of the requirements as defined in ref. [2]. The OBE supplier (alternatively the TSP) fills in the state of compliance relevant for the OBE covered by this document at stated in chapter 2.

In the “State of Compliance” coloumn, for each requirement there shall be a statement on the state of the compliance as follows:

F = Fully Compliant

P = Partially Compliant (see comments)

N = Not Compliant

n/a = Not Applicable

For those requirements where the TSP provides the requested information separately from the manufacturers documentation, this will be mentioned in the “Comments” coloumn.

# Data requirements

## General

|  |  |  |  |
| --- | --- | --- | --- |
| **ID** | **Requirement** | **State of Compliance** | **Comments** |
|  | The TSP shall provide all necessary information regarding master security keys and initialisation data for all elements in the OBE based on requirements in this document. |  |  |

## Element specification

### The EFC element (AID = 1 “electronic fee collection”)

|  |  |  |  |
| --- | --- | --- | --- |
| **ID** | **Requirement** | **State of Compliance** | **Comments** |
|  | The EFC element shall be organised and include the data attributes as shown in Figure 3. OBE shall support these attributes and a guideline for initialisations with values according to Appendix A Example of element coding in EFC element. |  |  |

### (Option) The ITS element (AID = 29)

|  |  |  |  |
| --- | --- | --- | --- |
| **ID** | **Requirement** | **State of Compliance** | **Comments** |
|  | The ITS element shall, if implemented, be organised and include the data attributes as shown in Figure 4. |  |  |
|  | The ITS element shall, if implemented, not have access control (security level 0). |  |  |
|  | The value of AttrID=87 shall be a random number between 0 and 32767 (0x0000 and 0x7FFF in hexadecimal). |  |  |
|  | For each value for RndItsId there shall be 5 OBE produced which have the same value for RndItsId. (Within the same production batch). |  |  |

## EFC element content

|  |  |  |  |
| --- | --- | --- | --- |
| **ID** | **Requirement** | **State of Compliance** | **Comments** |
|  | Personalization shall be made by the Contract Issuer (TSP) in a way that is compatible with the specification in Appendix A, which is based on EN ISO 14906. |  |  |

# Functional requirements

## DSRC requirements

|  |  |  |  |
| --- | --- | --- | --- |
| **ID** | **Requirement** | **State of Compliance** | **Comments** |
|  | The OBE shall comply with the DSRC requirements in EN 15509. |  |  |
|  | The OBE shall comply with the EFC functions in EN 15509 and must conform to the base standards as shown in figure 7. |  |  |

## Initialisation requirements

|  |  |  |  |
| --- | --- | --- | --- |
| **ID** | **Requirement** | **State of Compliance** | **Comments** |
|  | The OBE shall be initialised with the EFC element and attributes as organised and defined in section 5 Data requirements enabling values to be written to the different attributes in the element. |  |  |
|  | The TSP shall describe the use of obeStatus being part of the ObeConfiguration sent in the VST. Recommended use (from prior AutoPASS specification): “Shall be initialised with 0000 0000 0000 0000 'B. All 16 bits in obeStatus for the OBE application shall not be changed from the value 0 during the OBE lifetime except bit 6 in the first octet, ref. ISO 14906, that is used by a low voltage detection mechanism for setting the flag ”Low battery”. If instead bit 5 is used (for historical reasons), this must be specified by the TSP. |  |  |

## EFC transaction requirements

### EFC transactions

|  |  |  |  |
| --- | --- | --- | --- |
| **ID** | **Requirement** | **State of Compliance** | **Comments** |
|  | The OBE shall respond to any combination of requests from the RSE (including any combination of attributes) as defined in EN 15509. |  |  |
|  | The OBE shall have implemented the required OBE security related data required for Security Level 1 compliant to EN 15509. The attributes in the EFC element shall be protected by Security Level 1. |  |  |
|  | The RndOBE value to calculate the OBE access credentials (AC\_CR) shall be set randomly for each communication. |  |  |
|  | In order to support free-flow systems at high speeds, the OBE shall execute the tolling transaction successfully in less than 40ms. |  |  |
|  | The applicant must document that the OBE has a high rate of readability when communicating with an RSE environment compliant with the requirements in the AutoPASS RSE specification. |  |  |

### Multilane free-flow ability

|  |  |  |  |
| --- | --- | --- | --- |
| **ID** | **Requirement** | **State of Compliance** | **Comments** |
|  | The OBE must be able to handle - without decrease of its performance - simultaneous radiation of different carrier frequencies in case of overlapping communication zones of neighbouring beacons. |  |  |
|  | The OBE shall support all 4 downlink channels (D1 in EN 12253 [L1]). |  |  |

### Data storage

|  |  |  |  |
| --- | --- | --- | --- |
| **ID** | **Requirement** | **State of Compliance** | **Comments** |
|  | Personalisation and transaction data shall be stored in a way that data integrity is ensured under all operating conditions, including battery low-voltage situations. |  |  |
|  | In situations where data integrity cannot be guaranteed, the OBE shall not respond on the DSRC link (i.e. in case the OBE cannot ensure that stored data are correctly retrieved, or that received data are correctly stored). |  |  |
|  | It must be assured, that transaction data written to OBE are corresponding to the transaction data of the RSE. |  |  |

### Multiple transactions

|  |  |  |  |
| --- | --- | --- | --- |
| **ID** | **Requirement** | **State of Compliance** | **Comments** |
|  | The OBE shall not produce more than one transaction inside the RSE communication zone, even for a longer period. |  |  |

# Technical requirements

## MMI requirements and guidelines

|  |  |  |  |
| --- | --- | --- | --- |
| **ID** | **Requirement** | **State of Compliance** | **Comments** |
|  | The OBE shall have a buzzer enabling the RSE to give the user an auditory signal in compliance with the EN ISO 14906 EFC function SET\_MMI. |  |  |
|  | The OBE buzzer is recommended to have a sound with a frequency between 3,5 – 4,0 kHz. |  |  |
|  | The OBE buzzer is recommended to have a sound level between 75 and 85 dB A measured in front of the OBE, distance 10 cm, measured inside an anechoic chamber. |  |  |
|  | The OBE must respond to the following ActionParameters (in parenthesis) and is recommended to enable the following audio signals: ok (0) with beep sequence BB000000 nok (1) with beep sequence B0B0B0B0 contactOperator (2) with beep sequence BBB00BBB noSignalling (255) ---- no beeps (e.g. to be used in single lane with light signals)  where B means sound in 0,1 second and 0 means silence in 0,1 second. |  |  |
|  | To retain compatibility with existing OBE (and RSE), the OBE shall accept SET\_MMI with any value of the EID, and with Container type = 69(dec). The AutoPASS RSE will use Container type = 69 (dec) unless otherwise agreed. |  |  |

## Environmental requirements

### Climatic conditions

|  |  |  |  |
| --- | --- | --- | --- |
| **ID** | **Requirement** | **State of Compliance** | **Comments** |
|  | The OBE including the battery shall comply with the Class 5K2 in IEC 60721-3-5. |  |  |

### Biological conditions

|  |  |  |  |
| --- | --- | --- | --- |
| **ID** | **Requirement** | **State of Compliance** | **Comments** |
|  | The OBE shall comply with the Class 5B1 in IEC 60721-3-5. |  |  |

### Chemically active substances

|  |  |  |  |
| --- | --- | --- | --- |
| **ID** | **Requirement** | **State of Compliance** | **Comments** |
|  | The OBE shall comply with the Class 5C1 in IEC 60721-3-5. |  |  |

### Mechanically active substances

|  |  |  |  |
| --- | --- | --- | --- |
| **ID** | **Requirement** | **State of Compliance** | **Comments** |
|  | The OBE shall comply with the Class 5S1 in IEC 60721-3-5. |  |  |

### Contaminating fluids

|  |  |  |  |
| --- | --- | --- | --- |
| **ID** | **Requirement** | **State of Compliance** | **Comments** |
|  | The OBE shall comply with the Class 5F1 in IEC 60721-3-5. |  |  |

### Mechanical conditions

|  |  |  |  |
| --- | --- | --- | --- |
| **ID** | **Requirement** | **State of Compliance** | **Comments** |
|  | The OBE shall comply with the Class 5M3 in IEC 60721-3-5. |  |  |

### Other environmental requirements

|  |  |  |  |
| --- | --- | --- | --- |
| **ID** | **Requirement** | **State of Compliance** | **Comments** |
|  | The OBE encapsulation shall be compliant with IP 40 as specified in IEC 529. |  |  |
|  | The OBE shall be compliant with Radio Equipment Directive (RED) 2014/53/EU |  |  |
|  | The OBE shall be compliant with Directive 2004/108/EC |  |  |
|  | The OBE shall be compliant with EN 300 674-2-2 |  |  |
|  | The OBE shall be compliant with Directive 2012/19/EU |  |  |
|  | The OBE shall be compliant with Directive 2011/65/EU |  |  |
|  | The OBE shall be compliant with the Directive 2006/95/EC |  |  |

## Installation requirements

|  |  |  |  |
| --- | --- | --- | --- |
| **ID** | **Requirement** | **State of Compliance** | **Comments** |
|  | The TSP must facilitate correct installation of the OBE. |  |  |
|  | The OBE installation procedure must ensure proper OBE to RSE communication by complying with the maximum tolerances for the position and orientation of the OBE in the windscreen, as defined by the OBE manufacturer's specification. |  |  |
|  | The OBE installation procedure must ensure proper OBE to RSE communication for windscreens mounted at all normal angles found in light and heavy vehicles. |  |  |

## Marking and identification

|  |  |  |  |
| --- | --- | --- | --- |
| **ID** | **Requirement** | **State of Compliance** | **Comments** |
|  | It shall be possible to visually verify the OBE identity. This may be achieved by a printed or burned OBE unique ID on the unit case, alternatively by use of a display (MMI). Any print must be visible throughout the lifetime of the OBE, i.e. UV resistant etc.  The OBE unique ID print shall not be easily identifiable from the outside of the windscreen. |  |  |
|  | The OBE unique ID displayed or printed/burned on the OBE shall be either:   * 1. Equal to the Personal Account number (PAN) as defined in section 5.3.  1. An alphanumeric ID which is unique for every OBE issued by the TSP. Information on the identity of the vehicle (LPN and nationality) associated with the OBE unique ID must be available to the User so that the customer can verify that the OBE is installed in the vehicle that is on the AutoPASS contract.   Since the PAN of the EFC element to be used in AutoPASS cannot be read off the OBE, there must be a way for the User to find this PAN without having to contact the customer service of the TSP. |  |  |
|  | If the OBE unique ID is not the PAN, service users of vehicles heavier than 3500 kg must be issued with a declaration from the TSP containing the following information:   * The OBE unique ID, printed alphanumerically and as a barcode. * If applicable, the OBE ID as shown in the display if it differs from the printed OBE unique ID. An acceptable deviation will be the addition or removal of a check digit. If present, it shall be printed alphanumerically and as a barcode. * The PAN of the EFC element to be used in AutoPASS, printed alphanumerically and as a barcode. * The LPN and nationality of the vehicle.   The TSP must inform Users of vehicles heavier than 3500kg that this declaration must always be carried on board when driving in Norway. The driver must always be prepared to show the declaration together with the OBE for control purposes. |  |  |
|  | Preferably there may also be a barcode representation of the OBE unique ID. The OBE unique ID barcode is recommended to be of barcode type code 128 including the Luhn digit of the PAN. |  |  |
|  | The OBE shall be marked CE according to relevant EC directives. |  |  |

## Security and safety

|  |  |  |  |
| --- | --- | --- | --- |
| **ID** | **Requirement** | **State of Compliance** | **Comments** |
|  | The OBE shall ensure the continued correct operation of its security functions and the integrity of stored critical data (such as cryptographic keys), in both normal and extreme environmental conditions. |  |  |
|  | The OBE shall prevent unauthorised read out or alteration by physical or logical tampering of critical data (such as cryptographic keys) or software stored in the OBE. There shall be no read access to authentication keys as well as to access keys. |  |  |
|  | The master access key and one master TC authentication key for the EFC element shall be made available for AutoPASS. These will be managed by the AutoPASS TTP on behalf of NPRA. The TTP is responsible for overseeing the secure transfer of security keys to TCs/RSE. |  |  |
|  | The OBE shall not interfere with the vehicle electronic system, e.g. vehicle electronic control units or airbags. |  |  |
|  | The OBE shall be protected against any type of electrical or environmental impact on the data and software stored in the OBE, e.g. low, variable or empty power source, electrostatic discharge (ESD) and electromagnetic interference (EMI). |  |  |

## Use of other elements in the OBE

|  |  |  |  |
| --- | --- | --- | --- |
| **ID** | **Requirement** | **State of Compliance** | **Comments** |
|  | Security keys for the EFC element are for the sole use by toll stations in AutoPASS and other European toll domains. Practically, this means:   1. Security keys for the EFC element cannot be distributed to actors other than those involved in tolling within AutoPASS/EETS. 2. Other elements that the TSP may add to the OBE are not allowed to use the same master keys as the ones used for the EFC element |  |  |
|  | Other elements that the TSP may add to the OBE may use the same OBE identifier (eg. PAN) as the EFC element, but only if the element is protected with security level 1. It shall not be possible to derive the ID/PAN of the EFC element from the ID of an open element with security level 0 (e.g. adding a “0” or other ways of altering the ID). |  |  |