

## II

*(Non-legislative acts)*

## REGULATIONS

## COMMISSION IMPLEMENTING REGULATION (EU) 2019/1213

of 12 July 2019

**laying down detailed provisions ensuring uniform conditions for the implementation of interoperability and compatibility of on-board weighing equipment pursuant to Council Directive 96/53/EC**

*(Text with EEA relevance)*

THE EUROPEAN COMMISSION,

Having regard to the Treaty on the Functioning of the European Union,

Having regard to Council Directive 96/53/EC of 25 July 1996 <sup>(1)</sup>, and in particular Article 10d(5) thereof,

Whereas:

- (1) On-board weighing equipment is an option provided for the Member States by Directive 96/53/EC for carrying out the control of vehicles or vehicle combinations which may be overloaded.
- (2) In line with the second paragraph of Article 10d(5) of Directive 96/53/EC, in order to ensure interoperability, the on-board weighing equipment has to be able to transmit weight data at any time from a moving vehicle to the competent authorities and to the driver through an interface defined by CEN DSRC standards. Technical specifications adapting the content of the standards to the specificities of the information to be provided by on-board weighing equipment should therefore be adopted.
- (3) On-board weighing equipment may be fitted in motor vehicles as well as in trailers and semi-trailers. It is necessary to guarantee that on-board weighing equipment fitted in different vehicles of a vehicle combination is mutually compatible. Compatibility should be ensured by the implementation of European standards on C-ITS as referred to in the delegated act supplementing Directive 2010/40/EU of the European Parliament and of the Council <sup>(2)</sup> with regard to the deployment and operational use of cooperative intelligent transport systems.
- (4) Member States mandating the instalment of on-board weighing equipment should be able to exempt from that obligation vehicles or vehicle combinations for which it is impossible to exceed the maximum authorised weight, such as trailers or semitrailers specifically designed for the carriage of liquids or livestock.
- (5) The use of on-board weighing equipment for the purpose of enforcement may trigger attempts of manipulation, as is the case with other vehicle systems, such as the digital tachograph or the systems for the restriction of emissions. In order to keep an appropriate level of security against manipulation, the communication between motor vehicle and trailer or semi-trailer must be secured. In addition, on-board weighing equipment should be certified according to the Common Criteria, by a certification body recognised by the Management Committee within the framework of the 'Mutual Recognition Agreement of Information Technology Security Evaluation Certificates' of the Senior Officials Group on Information Systems Security (SOG-IS).

<sup>(1)</sup> Council Directive 96/53/EC of 25 July 1996 laying down for certain road vehicles circulating within the Community the maximum authorised dimensions in national and international traffic and the maximum authorised weights in international traffic (OJ L 235, 17.9.1996, p. 59).

<sup>(2)</sup> Directive 2010/40/EU of the European Parliament and of the Council of 7 July 2010 on the framework for the deployment of Intelligent Transport Systems in the field of road transport and for interfaces with other modes of transport (OJ L 207, 6.8.2010, p. 1).

- (6) Member States which opt for the installation in the vehicle of on-board weighing equipment should ensure that the vehicles undergo inspections of that equipment by OBW-workshops. In order to ensure the uniform implementation of the interoperability rules set out in this Regulation, those workshops should guarantee that the on-board equipment is operating with the appropriate level of accuracy. Those workshops may be, subject to necessary adjustments, testing centres referred to in Directive 2014/45/EU of the European Parliament and of the Council <sup>(3)</sup>, workshops referred to in Regulation (EU) No 165/2014 of the European Parliament and of the Council <sup>(4)</sup>, or any other workshop respecting the requirements of this Regulation. Member States which do not opt for introducing on-board weighing equipment on the grounds of Article 10d(1) of Directive 96/53/EC should not need to set up those workshops.
- (7) The current state of the technology does not make possible the implementation of neither CEN DSRC nor C-ITS communication standards in on-board weighing equipment by 27 May 2021. A phased approach should therefore be adopted for the implementation of on-board weighing equipment so that industry is able to develop products compliant with the requirements of this Regulation, and in particular with its Annex II and certain requirements of Annex III. The Member States which opt for the installation in the vehicle of on-board weighing equipment should, by 27 May 2021, apply the requirements referring to stage 1 set out in Annexes I and III. An additional period of three years should be granted for the application of requirements set out in Annex II and those referring to stage 2 set out in Annexes I and III.
- (8) Member States may take specific measures to require that the vehicles to be checked by the competent authorities in order to ensure compliance with Directive 96/53/EC and which are put into circulation as of 27 May 2021 and registered in their territory, are fitted with an on-board weighing equipment. Vehicles put into circulation and registered before that date should not need to be retrofitted with such an equipment.
- (9) The measures provided for in this Regulation are in accordance with the opinion of the Road Transport Committee, referred to in Article 10i of Directive 96/53/EC,

HAS ADOPTED THIS REGULATION:

#### *Article 1*

##### **Scope**

- 1. This Regulation lays down uniform conditions for the interoperability and compatibility of on-board weighing equipment installed in vehicles or vehicle combinations for the purpose of ensuring compliance with Article 10d(4) to (5) of Council Directive 96/53/EC or the requirements on maximum weight for national traffic of the Member State where the vehicle is in use.
- 2. This Regulation shall not apply to Member States which have not opted for the introduction of on-board weighing equipment in accordance with Article 10d(1) of Directive 96/53/EC.
- 3. Member States may exempt from the obligation requiring the instalment of on-board weighing equipment in vehicles or vehicle combinations the design or type of load of which makes it impossible to exceed the maximum authorised weight. Those exemptions shall not be based on the technically permissible maximum laden mass of a vehicle indicated by the manufacturer. The vehicles or vehicle combinations which benefit from an exemption may still be subject to control by the competent authorities of the maximum authorised weight.

#### *Article 2*

##### **Definitions**

The following definitions shall apply:

- (a) 'on-board weighing equipment' ('OBW') means the equipment on-board a vehicle that is able to determine the total weight or the axle weight;
- (b) 'total weight' means the total weight of a motor vehicle and, in case of a vehicle combination, of the vehicle combination as determined by the OBW, in kilogram;

<sup>(3)</sup> Directive 2014/45/EU of the European Parliament and of the Council of 3 April 2014 on periodic roadworthiness tests for motor vehicles and their trailers and repealing Directive 2009/40/EC (OJ L 127, 29.4.2014, p. 51).

<sup>(4)</sup> Regulation (EU) No 165/2014 of the European Parliament and of the Council of 4 February 2014 on tachographs in road transport, repealing Council Regulation (EEC) No 3821/85 on recording equipment in road transport and amending Regulation (EC) No 561/2006 of the European Parliament and of the Council on the harmonisation of certain social legislation relating to road transport (OJ L 60, 28.2.2014, p. 1).

- (c) 'axle weight' or 'axle load' means the weight of a laden axle or group of axles as determined by the OBW, in kilogram;
- (d) 'calculated weight' or 'weight value' means either the total weight or the axle weight, in kilogram;
- (e) 'motor vehicle unit' ('MVU') means the part of the OBW placed in the motor vehicle, excluding the sensors, able to collect, store, process data and to calculate a weight value resulting from those data;
- (f) 'trailer unit' ('TU') means the part of the OBW placed in a trailer or semi-trailer, excluding the sensors, able to collect, store, process data from the trailer or semi-trailer equipment and to calculate axle weight values resulting from those data;
- (g) 'dedicated short range communication vehicle unit' ('DSRC-VU') means the 'remote early detection facility', as referred to in Appendix 14 to Annex IC to Commission Implementing Regulation (EU) 2016/799 <sup>(3)</sup>, able to receive the OWS data from either the MVU or the C-ITS station and to send it to the REDCR;
- (h) 'remote early detection communication reader' ('REDCR') means the remote early detection communication reader held by the enforcement authorities, which is able to read the OWS data transmitted by the DSRC-VU. The REDCR may be the same device as the one used for reading the RTM data pursuant to Regulation (EU) 2016/799, although both the transmission of the RTM data and that of the OWS data shall be carried out under separate requests from the REDCR;
- (i) 'weight data' means the raw data transmitted between elements of the OBW that must be processed in order to obtain the calculated weight;
- (j) 'on-board weighing system data' ('OWS data') means the secured data of defined format requested by the REDCR from the DSRC-VU;
- (k) 'sensor' means the element of the OBW that is able to generate weight data by measuring specific physical parameters, being those data used by either the MVU or the TU for further processing;
- (l) 'cooperative intelligent transport systems station' ('C-ITS station') means the C-ITS station within the meaning of the delegated act supplementing Directive 2010/40/EU of the European Parliament and of the Council with regard to the deployment and operational use of cooperative intelligent transport systems, adopted on the basis of Article 6(1) of that Directive;
- (m) 'address assignment phase' means the preliminary phase of electronic communication between vehicles of a vehicle combination whereby a position is assigned to each vehicle.
- (n) 'on-board weighing equipment workshop' ('OBW-workshop') means a workshop authorised by a Member State to perform inspections of on-board weighing equipment.

### Article 3

#### Certificates policy

Member States shall ensure that there is at least one root certification authority, an enrolment authority and an authorisation authority able to carry out, for the purpose of on-board weighing equipment, the functions set out in the Certificate Policy for Deployment and Operation of European Cooperative Intelligent Transport Systems (C-ITS) referred to in the delegated act supplementing Directive 2010/40/EU of the European Parliament and of the Council with regard to the deployment and operational use of cooperative intelligent transport systems, adopted on the basis of Article 6(1) of that Directive.

### Article 4

#### Periodic inspections

1. On-board weighing equipment shall be subject to a periodic inspection by an OBW-workshop every two years following its installation in the vehicle or vehicle combination.
2. Periodic inspections shall be performed in accordance with Annex IV.

<sup>(3)</sup> Commission Implementing Regulation (EU) 2016/799 of 18 March 2016 implementing Regulation (EU) No 165/2014 of the European Parliament and of the Council laying down the requirements for the construction, testing, installation, operation and repair of tachographs and their components (OJ L 139, 26.5.2016, p. 1).

3. The inspections shall ensure that the following requirements are complied with:
  - (a) the on-board weighing equipment has been fitted in accordance with the documentation provided by the manufacturer and is appropriate for the vehicle;
  - (b) the on-board weighing equipment is working properly and accurately delivers the weight values;
  - (c) there are no manipulation devices attached to the on-board weighing equipment or traces of use of such devices.
4. At the end of the inspection, the OBW-workshop shall issue an inspection report of the on-board weighing equipment. A copy of the report shall be kept in the vehicle.
5. The inspection report shall contain, at least, the following information:
  - (a) vehicle identification number (VIN number or chassis number);
  - (b) place and date of the test;
  - (c) test passed (yes/no);
  - (d) identified deficiencies, including manipulation, as well as the remedies adopted;
  - (e) date of the next periodic inspection or date of expiry of the current certificate, if this information is not provided by other means;
  - (f) Name, address and identification number of the OBW-workshop and signature or identification of the inspector responsible for the inspection;
  - (g) the mark, type, identification number, number of type examination certificate and date of last verification of the certified weighing device used for the periodic inspection.
6. Inspection reports shall be retained for a minimum period of two years from the time the report was made, although Member States may decide that the inspection reports are sent to the competent authority during that period. In cases where the inspection reports are kept by the OBW-workshop, the latter shall make available the reports of inspections and calibrations carried out during that period upon request from the competent authority.

#### Article 5

#### **OBW-workshops**

1. Member States shall approve, regularly audit and certify the OBW-workshops allowed to perform inspections of on-board weighing equipment.
2. Member States shall ensure that OBW-workshops located in their territories perform inspections of on-board weighing equipment in a reliable way. For that purpose, they shall establish and publish a set of procedures ensuring that the following minimum criteria are met:
  - (a) the staff of the OBW-workshop is properly trained;
  - (b) the equipment necessary to carry out the relevant tests and tasks is available and has been certified according to Directive 2014/31/EU of the European Parliament and of the Council <sup>(6)</sup> or Directive 2014/32/EU of the European Parliament and of the Council <sup>(7)</sup>;
  - (c) the workshops are of good repute.
3. OBW-workshops shall be subject to the following audits:
  - (a) at least every five years, to an audit performed by a supervising body on the procedures applied when handling on-board weighing equipment. The audit shall focus on the tasks and activities laid down in point 1 of Annex V to Directive 2014/45/EU; the supervising body shall fulfil the requirements laid down in point 2 of that Annex;
  - (b) unannounced technical audits may also take place in order to check the installations, inspections and, where appropriate, calibrations carried out.

<sup>(6)</sup> Directive 2014/31/EU of the European Parliament and of the Council of 26 February 2014 on the harmonisation of the laws of Member States relating to the making available on the market of non-automatic weighing instruments (OJ L 96, 29.3.2014, p. 107).

<sup>(7)</sup> Directive 2014/32/EU of the European Parliament and of the Council of 26 February 2014 on the harmonisation of the laws of Member States relating to the making available on the market of measuring instruments (OJ L 96, 29.3.2014, p. 149).

4. Member States shall take appropriate measures to prevent conflicts of interests between OBW-workshops and transport undertakings. In particular, where there is a serious risk of conflict of interests, including the ownership of OBW-workshops by transport undertakings, additional specific measures shall be taken to ensure that OBW-workshops comply with this Article.

5. The competent authorities of the Member States shall publish on their websites an updated list of OBW-workshops, with at least the following data:

- (a) workshop identification number and name of [entity/entities constituting] the workshop;
- (b) postal address;
- (c) email address;
- (d) telephone number.

6. The competent authorities in Member States shall withdraw approvals, either temporarily or permanently, from OBW-workshops which fail to meet their obligations under this Regulation.

#### *Article 6*

#### **Entry into force and application**

This Regulation shall enter into force on the twentieth day following that of its publication in the *Official Journal of the European Union*.

It shall apply from 27 May 2021.

However, points 1.4(d), 5.3 and 8.1 of Annex I, Annex II and points 3, 8.2 and 10 of Annex III shall apply from 27 May 2024.

This Regulation shall be binding in its entirety and directly applicable in all Member States.

Done at Brussels, 12 July 2019.

*For the Commission*

*The President*

Jean-Claude JUNCKER

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## ANNEX I

**GENERAL PROVISIONS FOR ON-BOARD WEIGHING EQUIPMENT ('OBW')****1. General provisions**

1.1. The following types of OBW systems are included in the scope of this Regulation:

- a) dynamic system: OBW system that determines the weight by collecting and processing information from parameters that are captured while the vehicle is in motion, such as accelerations, traction or braking forces, and which do not take place when the vehicle is standing still;
- b) static system: OBW system that determines the weight with information obtained from parameters that are captured while the vehicle is standing still, such as the pressure in an air bellow.

1.2. The implementation of this Regulation follows two stages:

- (a) stage 1 OBW referred to in point 5.2;
- (b) stage 2 OBW referred to in point 5.3.

1.3. The OBW shall calculate the total weight and, optionally, the axle weight.

1.4. The OBW shall comprise the following elements:

- a) a motor vehicle unit ('MVU') placed in the motor vehicle;
- b) optionally, a TU in the trailer or semi-trailer;
- c) sensors;
- d) for stage 2, a C-ITS station in each of the vehicles featuring either a MVU or a TU.

1.5. MVU and Trailer Unit may each consist of a single processing unit or be split into different units.

**2. Motor vehicle unit ('MVU')**

The MVU shall:

- a) receive the axle load from the TU, if the latter is present;
- b) collect weight data from the sensors in the motor vehicle;
- c) process the available information and calculate the corresponding weight values;

**3. Trailer unit ('TU')**

Where present, the TU shall:

- a) collect weight data from the sensors in the trailer or semi-trailer, process the available information and calculate the axle weights resulting from those data;
- b) transfer the axle weight values to the motor vehicle.

**4. Calculation of weight**

4.1. For dynamic systems, a first weight value shall be calculated at the latest 15 minutes after the vehicle starts to move forward and shall be recalculated, every 10 minutes henceforth or faster.

4.2. For static systems, weight values shall be calculated every minute when ignition is on and the vehicle is standing still.

4.3. The resolution of the calculated weight shall be 100 kg or better.

5. **Exchange of information between the motor vehicle and the trailers or semi-trailers of a vehicle combination**

5.1. Each trailer or semi-trailer shall make available to the motor vehicle the weight values calculated by the former in accordance with points 5.2 or 5.3, as applicable.

5.2. Stage 1 OBW

5.2.1. Each trailer or semi-trailer shall be assigned a position within the vehicle combination in the frame of a dynamic address assignment as set out in ISO 11992-2:2014.

5.2.2. After the address assignment phase is carried out, the TU of each trailer or semi-trailer shall transfer to the MVU the axle load sum or the axle load in accordance with the description provided in points 6.5.4.7 and 6.5.5.42 of ISO 11992-2:2014.

5.2.3. The messages on axle load sum or axle load shall follow the specifications set out in ISO 11992-2:2014 for the message types EBS22 and RGE22.

5.2.4. The format, routing and general parameter ranges of the messages shall be in accordance with points 6.1, 6.3 and 6.4 of ISO 11992-2:2014.

5.3. Stage 2 OBW

The information between motor vehicle and the trailers or semi-trailers being towed shall be exchanged by means of C-ITS stations as set out in Annex II.

5.4. For both stage 1 and stage 2 OBW, different specifications may be used, provided that the OBW equipment in the motor vehicle and in the trailers or semi-trailers are compatible with them.

6. **Data preparation and transfer to the DSRC-VU**

The MVU for stage 1 or the C-ITS station in the motor vehicle for stage 2, shall transmit to the DSRC-VU module the on-board weighing system ('OWS') data in accordance with Annex III.

Figure 1

Example of layout for OBW in a stage 1 truck/semi-trailer vehicle combination

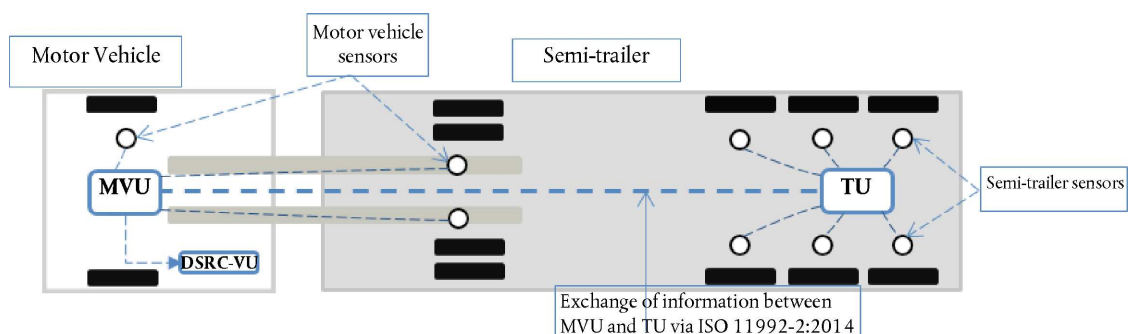
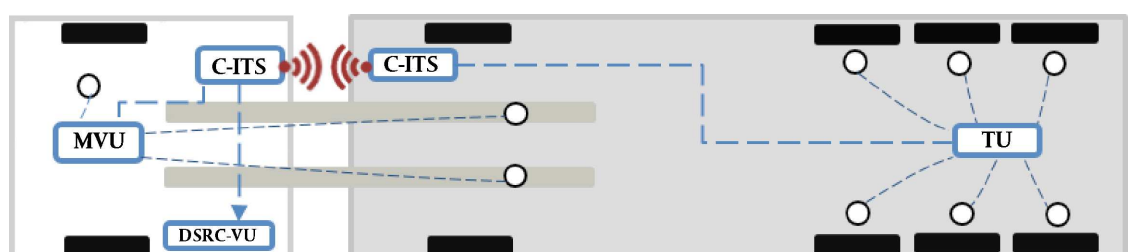


Figure 2

Example of layout for OBW in a stage 2 truck/semi-trailer vehicle combination



7. **Weight information to the driver**

The driver shall be informed by a display of, at least, the total weight.

8. **Accuracy**

8.1. The accuracy of the calculated weight shall be  $\pm 5\%$  or better when the vehicle is loaded at greater than 90 % of its maximum authorised weight.

8.2. Notwithstanding point 8.1, for stage 1 OBW the accuracy may be  $\pm 10\%$  or better.

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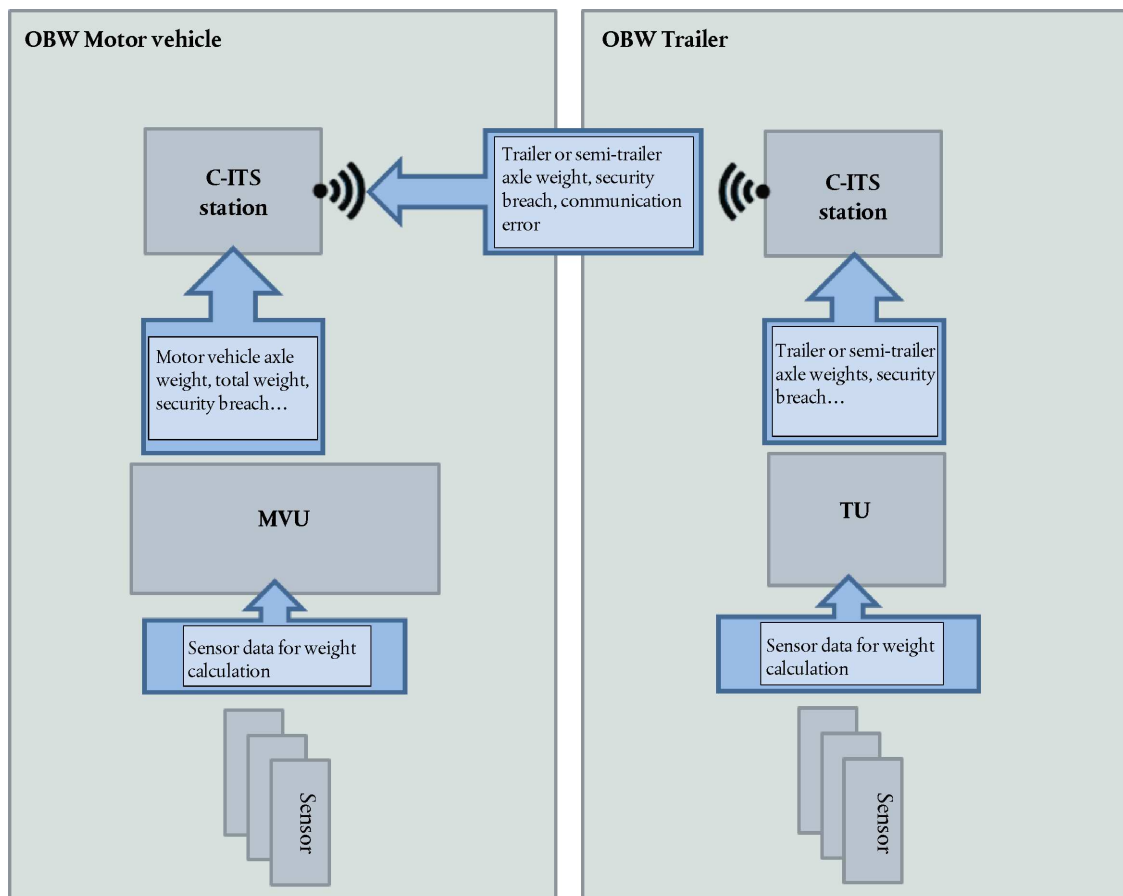
## ANNEX II

## SPECIFIC PROVISIONS FOR STAGE 2 OBW

1. This Annex applies exclusively to stage 2 OBW.
2. The motor vehicle and the trailers or semi-trailers of the vehicle combination featuring a trailer unit ('TU') shall be fitted with a C-ITS station connected to the motor vehicle unit ('MVU') or to the TU of the corresponding vehicle. The MVU and the TU may be integrated in their respective C-ITS stations.
3. The MVU and the TU shall transmit to the C-ITS stations to which they are connected the necessary information for the transmission of the messages in accordance with point 4.3 of this Annex.

Figure 3

## Example of flow of messages in a stage 2 OBW



4. Exchange of information between motor vehicle and trailer or semi-trailer
  - 4.1. The information on weight between motor vehicle and the trailers or semi-trailers being towed shall be exchanged through a wireless link set up between the C-ITS stations of the motor vehicle and those of the trailers or semi-trailers, in accordance with the standards EN 302 663-V1.1.1, with the exemption of clause 4.2.1, EN 302 636-4-1-V1.3.1, EN 302 636-5.1-V2.1.1 and with the European standard on the OBW application for C-ITS that shall be developed by ETSI.
  - 4.2. Messages exchanged by the C-ITS stations shall be secured as laid down in point 5.1.
  - 4.3. the following information shall be transmitted between the C-ITS stations:
    - a) axle weight of the trailers or semi-trailers being towed;

- b) messages containing 'OBW communication error' events: a OBW communication error event shall be triggered when the C-ITS stations fail to establish a mutual secured communication in accordance with point 5.1 for more than three attempts;
  - c) messages containing a 'security breach attempt' event: a security breach attempt event shall be triggered when an attempt to manipulate the OBW as set out in point 5.2 and in the Appendix has been detected by the OBW.
- 4.4. The format of the messages needed for the address assignment phase and for the transmission of the information referred to in point 4.3 shall be set out in the standard on the OBW application referred to in point 4.1.
5. Security provisions
- 5.1. Secure communication between C-ITS stations
- 5.1.1. The communication between C-ITS stations shall be secured in accordance with the European standard ETSI TS 103 097-V1.3.1 and with the European standard on the OBW application for C-ITS referred to in point 4.1.
- 5.1.2. In accordance with the Certificate Policy for Deployment and Operation of European Cooperative Intelligent Transport Systems, adopted by the Commission, the C-ITS stations shall get:
- a) An enrolment credential from an enrolment authority, authorising them to operate as C-ITS stations for the purpose of on-board weighing.
  - b) A number of authorisation tickets from an authorisation authority allowing them to operate within the C-ITS environment as part of the OBW.
- 5.2. Protection against security breach attempts
- The protection of stage 2 OBW against security breach attempts shall be implemented in accordance with the Appendix to this Annex.
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## APPENDIX TO ANNEX II

**SECURITY CERTIFICATION FOR STAGE 2 OBW**

1. The MVU and the TU shall be security certified according to the Common Criteria Scheme. In this Appendix, the MVU and the TU are hereafter referred to as 'OBW-VU'.
2. The minimum security requirements to be met by OBW-VU shall be defined in a Security Target ('ST') according to the Common Criteria Scheme.
3. The ST shall be drafted by the manufacturer of the equipment to be certified, and approved by a governmental IT security certification body organised within the Joint Interpretation Working Group ('JIWG') which is supporting the mutual recognition of certificates under the umbrella of the European SOGIS-MRA (Agreement on Mutual Recognition of Information Technology Security Evaluation Certificates).
4. The V2X gateway and the Hardware Security Module of the C-ITS stations shall be security certified against the V2X Gateway and Hardware Security Module protection profiles developed by the Car2Car Communication Consortium.
5. The assurance level for the security certification of the OBW-VU shall be EAL2. However, if the tachograph is used as MVU, the former shall be certified against an assurance level EAL4 augmented by the assurance components ATE\_DPT.2 and AVA\_VAN.5, as set out in Appendix 10 to Annex IC to Regulation (EU) 2016/799.
6. Assets to be protected by the ST

The following assets shall be protected:

- a) OBW-VU message: any message which is sent or received by a relevant OBW-VU module bearing information that is necessary for the calculation of the weight.

The relevant OBW modules are those hardware and software units of the OBW-VU which process information that, if attacked, may result in a miscalculation by the OBW of the total or axle weight.

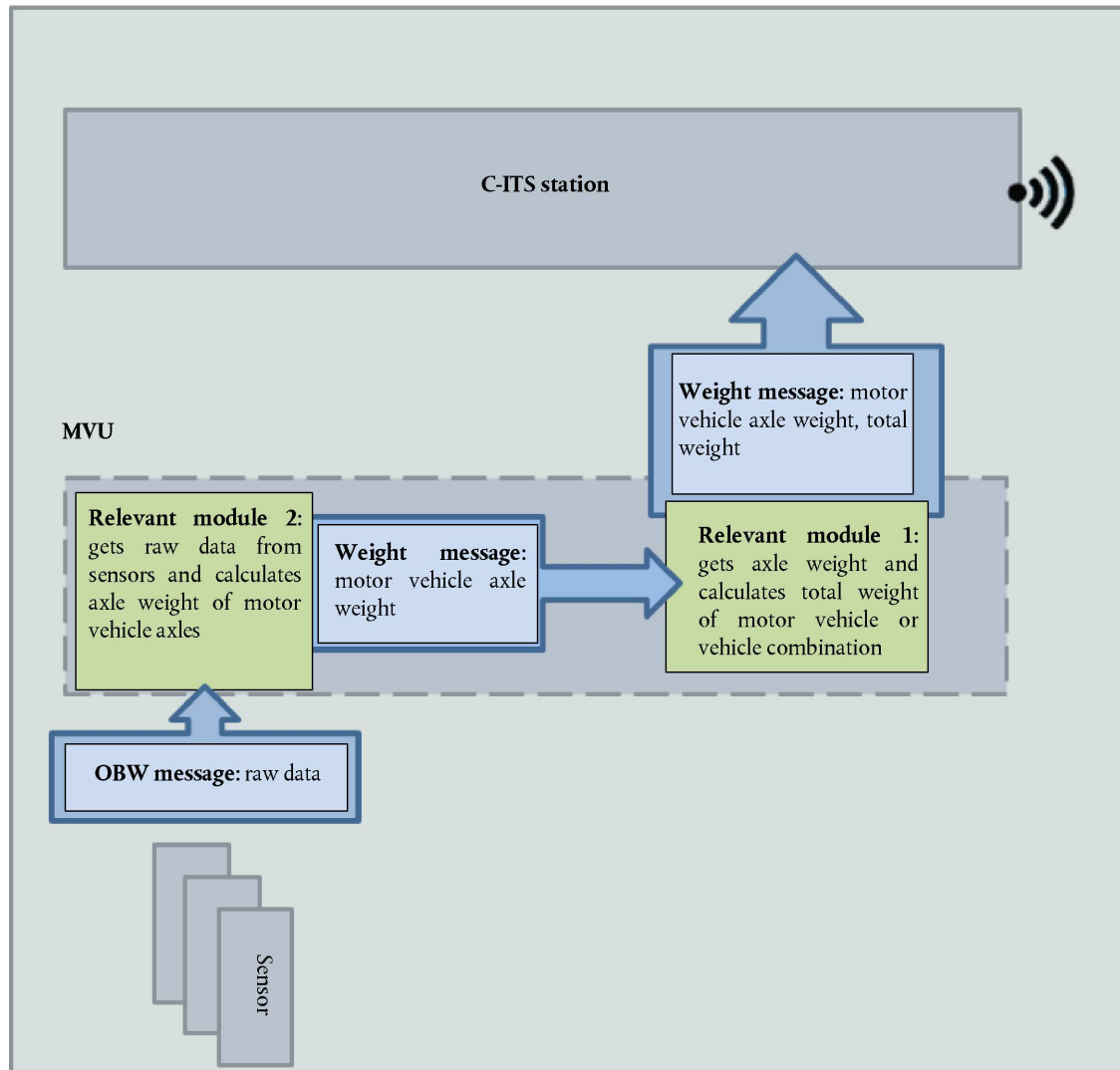
A OBW-VU may be a single relevant module or be composed of different relevant modules, in accordance with point 1.5 of Annex I, in which case the ST shall identify them.

- b) Weight message: message containing the total or axle weight calculated by the OBW-VU.
- c) Calibration data: information that is entered in the OBW-VU memory in order to calibrate the OBW.
- d) Audit information: information on security breach attempts corresponding to the threats addressed in this Appendix.
- e) OBW-VU software: software used within the OBW-VU to implement and support OBW functions which is relevant for the calculation of the weight and the detection of security breach attempts.

Figure 4

Example of OBW-VU messages and Weight messages to be protected in a MVU composed of two relevant modules

OBW Motor vehicle



## 7. Threats to be addressed in the ST

The ST shall address the following threats:

- T.OBW-VU\_message\_spoof: an attacker could spoof OBW-VU messages so that the OBW-VU miscalculates the total or axle weight.
- T.OBW-VU\_message\_tamper: an attacker could tamper OBW-VU messages so that the OBW-VU miscalculates the total or axle weight.
- T.Weight\_message\_spoof: an attacker could spoof weight messages so that the weight calculated by the OBW-VU is modified.
- T.Weight\_message\_tamper: an attacker could tamper weight messages so that the weight calculated by the OBW-VU is modified.
- T.Audit\_spoof: an attacker could spoof audit information messages.
- T.Audit\_tamper: an attacker could tamper audit information messages.
- T.Calibration\_tamper: an attacker could enter wrong values as calibration data in order to induce the OBW-VU to miscalculate the weight.

- h) T.Software\_tamper: an attacker could modify or replace the OBW-VU software in order to alter the normal calculation of the weight.
- i) T.Stored\_Data\_tamper: an attacker could try to modify or delete the relevant information stored in the OBW-VU, including audit information.
8. The security objectives for the OBW-VU shall be the following:
- a) O.Plausibility\_validation: the OBW-VU shall verify that information from an incoming message to a relevant module, either from the sensors or from another module, can be trusted on the basis of its plausibility.
- b) O.OBW-VU\_stored\_information\_protection: the OBW-VU shall be able to protect stored software and data from tampering.
- c) O.Notification: the OBW-VU shall be able to notify a security breach attempt.
9. Rationale
- a) T.OBW-VU\_message\_spoof is addressed by O.Plausibility\_validation and by O.Notification.
- b) T.OBW-VU\_message\_tamper is addressed by O.Plausibility\_validation and by O.Notification.
- c) T.Weight\_message\_spoof is addressed by O.Plausibility\_validation and by O.Notification.
- d) T.Weight\_message\_tamper is addressed by O.Plausibility\_validation and by O.Notification.
- e) T.Audit\_spoof is addressed by O.Plausibility\_validation and by O.Notification.
- f) T.Calibration\_tamper is addressed by O.Plausibility\_validation and by O.Notification.
- g) T.Software\_tamper is addressed by O.OBW-VU\_stored\_information\_protection and by O.Notification.
- h) T.Stored\_data\_tamper is addressed by O.OBW-VU\_stored\_information\_protection and by O.Notification.

Table 1

**Security objectives rationale**

|                         | O.Plausibility_validation | O.OBW-VU_stored_information_protection | O.Notification |
|-------------------------|---------------------------|----------------------------------------|----------------|
| T.OBW_message_spoof     | X                         |                                        | X              |
| T.OBW_message_tamper    | X                         |                                        | X              |
| T.Weight_message_spoof  | X                         |                                        | X              |
| T.Weight_message_tamper | X                         |                                        | X              |
| T.Audit_spoof           | X                         |                                        | X              |
| T.Audit_tamper          | X                         |                                        | X              |
| T.Calibration_tamper    | X                         |                                        | X              |
| T.Software_tamper       |                           | X                                      | X              |
| T.Stored_data_tamper    |                           | X                                      | X              |

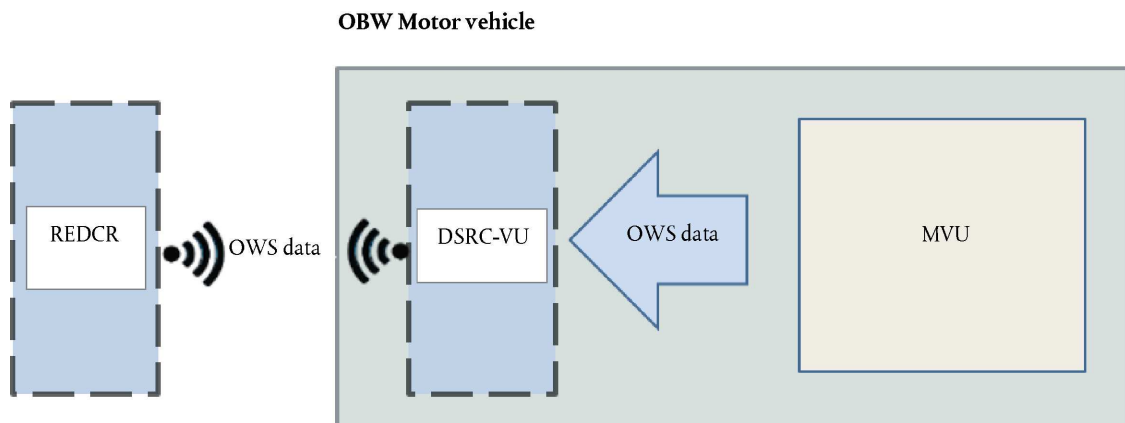
## ANNEX III

## DATA PREPARATION AND TRANSFER OF INFORMATION TO THE REDCR

1. This Annex, complementary to Appendix 14 to Annex IC to Regulation (EU) 2016/799 (henceforth Appendix 14), specifies the requirements for the preparation and transfer of OWS data from the motor vehicle to the Remote Early Detection Communication Reader ('REDCR').
2. On-board weighing system ('OWS') data transfer for stage 1 OBW
  - 2.1. OWS data shall be provided to the dedicated short range communication vehicle unit ('DSRC-VU') by the motor vehicle unit ('MVU').
  - 2.2. The MVU shall:
    - 2.2.1. Build up the OWS data with the information received from the MVU and the trailer unit ('TU'), according to the structure set out in point 6;
    - 2.2.2. forward the OWS data to the DSRC-VU for further transmission to the REDCR.

Figure 5

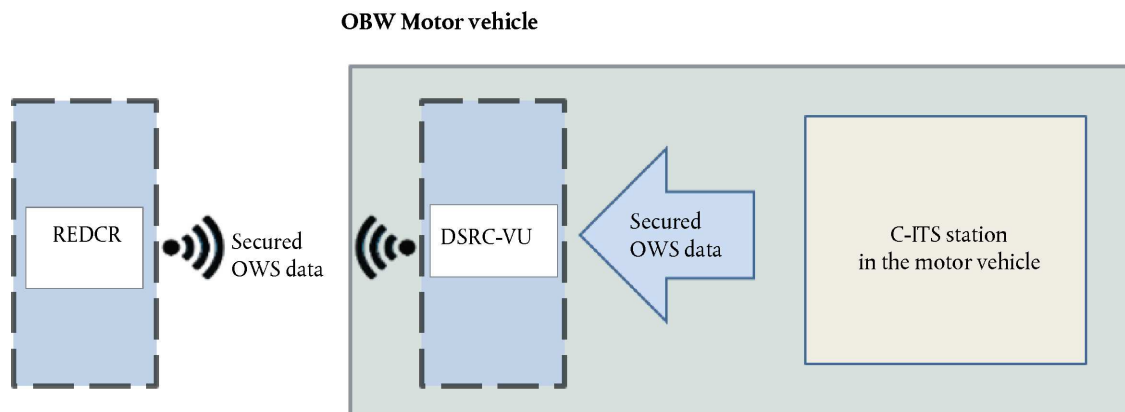
## Transmission of OWS data from the MVU to the REDCR for stage 1 OBW



3. OWS data transfer for stage 2 OBW
  - 3.1. OWS data shall be provided to the DSRC-VU by the C-ITS station in the motor vehicle.

Figure 6

## Transmission of OWS data from the C-ITS station to the REDCR for stage 2 OBW



- 3.2. The C-ITS station in the motor vehicle shall:
  - 3.2.1. Build up the OWS data with the information received from the MVU and the C-ITS stations of the trailers or semi-trailers being towed, according to the structure set out in point 6;
  - 3.2.2. secure the OWS data as laid down in point 8, and
  - 3.2.3. forward the OWS data to the DSRC-VU for further transmission to the REDCR.
4. Data transfer between the DSRC-VU and either the MVU (stage 1) or the C-ITS station in the motor vehicle (stage 2) shall be implemented as set out in point 5.6 of Appendix 14, where VU shall be understood as being either the MVU or the C-ITS station, depending on the stage.
5. Communication between the DSRC-VU and the REDCR
  - 5.1. The communication between the DSRC-VU and the REDCR shall be carried out through the interface defined by the CEN DSRC standards EN 12253, EN 12795, EN 12834, EN 13372 and ISO 14906, as referred to in Council Directive 96/53/EC.
  - 5.2. The transaction protocol to download OWS data across the 5.8 GHz DSRC interface link shall be the same as the one used for the RTM data in point 5.4.1 of Appendix 14, the only difference being that the Object Identifier that relates to the TARV standard shall be addressing the ISO 15638 standard (TARV) Part 20 related to WOB/OWS.
  - 5.3. The commands used for an OWS transaction shall be the same as those set out in point 5.4.2 of Appendix 14 for a RTM transaction.
  - 5.4. The interrogation command sequence for OWS data shall be the same as the one set out in point 5.4.3 of Appendix 14 for RTM data.
  - 5.5. Data transfer mechanism and DSRC transaction description shall be the same as set out in points 5.4.6 and 5.4.7 of Appendix 14. The Vehicle Service Table shall be however adapted for the transmission of OWS data. Consequently, the Rtm-ContextMark shall be replaced by an Ows-ContextMark, which object identifier shall refer to the ISO 15638 standard (TARV) Part 20 related to WOB/OWS.
  - 5.6. The DSRC physical interface parameters shall be the same as those set out in point 5.3 of Appendix 14.

## 6. Data structure

The ASN.1 module definition for the DSRC data within the OWS application is defined as follows:

```
TarvOws      {iso(1)      standard(0)      15638
part20(20)    version1(1)}    DEFINITIONS
AUTOMATIC TAGS

 ::= BEGIN

IMPORTS

-- Imports data attributes and elements from EFC which are used for OWS

LPN

FROM EfcDsrcApplication {iso(1) standard(0) 14906 application(0) version5(5)}

-- Imports function parameters from the EFC Application Interface Definition
SetMMIRq

FROM EfcDsrcApplication {iso(1) standard(0) 14906 application(0) version5(5)}

-- Imports the L7 DSRCData module data from the EFC Application Interface Definition
Action-Request, Action-Response, ActionType, ApplicationList, AttributeIdList,
AttributeList, Attributes,

BeaconID, BST, Dsrc-EID, DSRCAApplicationEntityID, Event-Report-Request, Event-
Report- Response,

EventType, Get-Request, Get-Response, Initialisation-Request, Initialisation-Response,
ObeConfiguration, Profile, ReturnStatus, Time, T-APDUs, VST

FROM EfcDsrcGeneric {iso(1) standard(0) 14906 generic(1) version5(5)};

-- Definitions of the OWS functions:

OWS-InitialiseComm-Request ::= BST

OWS-InitialiseComm-Response ::= VST

OWS-DataRetrieval-Request ::= Get-Request  (WITH COMPONENTS {fill (SIZE(1)), eid,
accessCredentials ABSENT, iid ABSENT, attrIdList})

OWS-DataRetrieval-Response ::= Get-Response {OwsContainer} (WITH COMPONENTS {..., eid,
iid ABSENT})

OWS-TerminateComm ::= Event-Report-Request {OwsContainer} (WITH COMPONENTS {mode (FALSE),
eid (0),
eventType (0)})

OWS-TestComm-Request ::= Action-Request {OwsContainer} (WITH COMPONENTS {..., eid (0),
actionType
(15), accessCredentials ABSENT, iid ABSENT})

OWS-TestComm-Response ::= Action-Response {OwsContainer} (WITH COMPONENTS {..., fill
(SIZE(1)), eid
(0), iid ABSENT})

-- Definitions of the OWS attributes:

OwsData ::= SEQUENCE {
    OWSPayload SignedDataPayload, -- SignedData in accordance with ETSI 103097
    v1.3.1, only for Stage 2 OBW
}
```

```

OwsPayload:: = SEQUENCE {

    recordedWeight          INTEGER (0..65535),      -- 0 = Total
    measured weight of the heavy goods vehicle with 10 Kg resolution.

    maximumTechnicalWeight  INTEGER (0..65535),      -- 0 = technically
    permissible maximum laden mass of the vehicle or vehicle combination as declared by the
    manufacturer, with 10 Kg resolution, only for stage 2.

    axlesConfiguration OCTET STRING SIZE (4), -- 0 = 20 bits allowed for the
    number of axles for 10 axles.

    axlesRecordedWeight OCTET STRING SIZE (26), -- 0 = Recorded Weight for
    each axle with 10 Kg resolution.

    tp15638Timestamp        INTEGER(0..4294967295)  -- Timestamp of
    current record

    tp15638DSRCcommunicationError  BOOLEAN,      -- Record of a
    communication error between MVU and DSRC within last 10 days

    tp15638OBWCommunicationError  BOOLEAN,      -- Record of a communication error

    tp15638SecurityBreachAttempt  BOOLEAN,      -- Record of a security
    breach attempt

}

Ows-ContextMark::= SEQUENCE {

    standardIdentifier StandardIdentifier, -- identifier of the TARV part and its
    version

}

StandardIdentifier::= OBJECT IDENTIFIER

OwsContainer::= CHOICE {

    integer [0] INTEGER,
    bitstring [1] BIT STRING,
    octetstring [2] OCTET STRING (SIZE (0..127, ...)),
    universalString [3] UniversalString,
    beaconId [4] BeaconID,
    t-apdu [5] T-APDUs,
    dsrcApplicationEntityId [6] DSRCApplicationEntityID,
    dsrc-Ase-Id [7] Dsrc-EID,
    attrIdList [8] AttributeIdList,
    attrList [9] AttributeList{RtmContainer},
    reserved10 [10] NULL,
    OwsContextmark [11] Ows-ContextMark,
    OwsData [12] OwsData,
    reserved13 [13] NULL,
    reserved14 [14] NULL,
    time [15] Time,
    -- values from 16 to 255 reserved for ISO/CEN usage
}

END

```

## 7. Elements of OWS data, actions performed and definitions:

The OWS data shall be calculated by either the MVU (stage 1) or the C-ITS station in the motor vehicle (stage 2) according to table 1

Table 1

**Elements of OWS data, actions performed and definitions**

| OWSData element                                    | Action performed by the C-ITS station in the motor vehicle                                                                                                                                                                                                                                                                             | Comment                                                                                     | ASN.1 definition of data                       |
|----------------------------------------------------|----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|---------------------------------------------------------------------------------------------|------------------------------------------------|
| OWS1<br>Total weight                               | An integer value shall be generated.                                                                                                                                                                                                                                                                                                   | Last measured total weight                                                                  | recordedWeight<br>INTEGER (0..65535),          |
| OWS2<br>technically permissible maximum laden mass | An integer value shall be generated                                                                                                                                                                                                                                                                                                    | Technically permissible maximum laden mass declared by the manufacturer                     | maximumTechnicalWeight<br>INTEGER (0..65535)   |
| OWS3<br>Axles configuration of the vehicle         | An octet string size 4 shall be generated.                                                                                                                                                                                                                                                                                             | Axles configuration                                                                         | axlesConfiguration<br>OCTET STRING SIZE (4),   |
| OWS4<br>Axle weight                                | An octet string size 26 shall be generated.                                                                                                                                                                                                                                                                                            | Weight per axle                                                                             | axlesRecordedWeight<br>OCTET STRING SIZE (26), |
| OWS5<br>Time recorded total weight                 | An integer value shall be generated.<br>The value for OWS2 shall be set to the time of the current record of total weight.                                                                                                                                                                                                             | Timestamp of the current recorded weight                                                    | tp15638Timestamp<br>INTEGER (0..4294967295),   |
| OWS6<br>DSRC Communication error                   | A Boolean value shall be generated.<br>A TRUE value to the tp15638DSRCcommunicationError variable shall be assigned if the OBW has encountered at least one event of type Communication Error with the DSRC-VU in the last 30 days.<br>ELSE if there are no events in the last 30 days, a FALSE value shall be assigned.               | 1 (TRUE), indicates communication error between the OBW and the DSRC-VU in the last 30 days | tp15638DSRCcommunicationError,<br>BOOLEAN,     |
| OWS7<br>OBW Communication error                    | A Boolean value shall be generated.<br>A TRUE value to the tp15638CommunicationError variable shall be assigned if the OBW has encountered at least one OBW communication error event inside the OBW in the last 30 days.<br>ELSE if there are no events in the last 30 days, a FALSE value shall be assigned.                         | 1 (TRUE), indicates communication error in the OBW in the last 30 days                      | tp15638OBWCommunicationError,<br>BOOLEAN,      |
| OWS8<br>Security Breach Attempt                    | A Boolean value shall be generated.<br>A TRUE value to the tp15638SecurityBreachAttempt variable shall be assigned if the OBW has in the last 2 years recorded at least one event of type security breach attempt.<br>ELSE if there have not been security breach attempt events in the last 2 years, a FALSE value shall be assigned. | 1 (TRUE), indicates a security breach attempt to the OBW within last 2 years                | tp15638SecurityBreachAttempt<br>BOOLEAN,       |

where

- a) recordedWeight represents the total measured weight of the vehicle or vehicle combination with a resolution of 10 kg as defined in EN ISO 14906. For example, a value of 2 500 represents a weight of 25 ton.
- b) axlesConfiguration represents the configuration of the vehicle or vehicle combination as number of axles.

The configuration is defined with the bit mask of 20 bits (extended from EN ISO 14906).

A bit mask of 2 bits represents the configuration of an axle with the following format:

- Value 00B means that value is 'non available' because the vehicle does not have equipment to collect the weight on the axle.
- Value 01B means that the axle is not present.
- Value 10B means that the axle is present and the weight has been calculated and collected and it is provided in the axlesRecordedWeight field.
- Value 11B is reserved for future uses.

The last 6 bits are reserved for future uses.

Table 2

**Bit distribution for OWS2**

| Number of Axles                 |                 |                 |                 |                 |                 |                            |                 |                 |                 |                 |                 |                 |                 |
|---------------------------------|-----------------|-----------------|-----------------|-----------------|-----------------|----------------------------|-----------------|-----------------|-----------------|-----------------|-----------------|-----------------|-----------------|
| Number of axles on tractor unit |                 |                 |                 |                 |                 | Number of axles on trailer |                 |                 |                 |                 |                 |                 |                 |
| 00/01/<br>10/11                 | 00/01/<br>10/11 | 00/01/<br>10/11 | 00/01/<br>10/11 | 00/01/<br>10/11 | 00/01/<br>10/11 | 00/01/<br>10/11            | 00/01/<br>10/11 | 00/01/<br>10/11 | 00/01/<br>10/11 | 00/01/<br>10/11 | 00/01/<br>10/11 | 00/01/<br>10/11 | RFU<br>(6 bits) |

- c) axlesRecordedWeight represent the specific weight recorded for each axle with a resolution of 10 Kg. Two octets are used for each axle. For example, a value of 150, represent a weight of 1 500 Kgs.
- d) maximumTechnicalWeight represent the technically permissible maximum laden mass of the vehicle or vehicle combination as declared by the manufacturer. This value shall only be provided for stage 2. For stage 1, a 0 value shall be assigned.

8. OWS data signature

8.1. For stage 1, the OWS data shall not be signed; the plaintext of the OWS data shall be transferred from the MVU to the DSRC-VU.

8.2. For stage 2, the OWS data shall be signed in the C-ITS station of the motor vehicle and transferred from the latter to the DSRC-VU, in accordance with the following provisions:

8.2.1. The secured data structure shall be constructed as set out in points 5.1 and 5.2 of ETSI TS 103 097-V1.3.1.

8.2.2. The type SignedData referred to in point 5.2 of ETSI TS 103 097-V1.3.1 shall have the following constraints:

- a) The type HashAlgorithm shall be set at sha256.
- b) The type SignerIdentifier shall be set at 'digest'.
- c) The type SignedDataPayload shall be the OWS data as laid down in point 7.
- d) The type HeaderInfo shall be constrained to have the following security headers:
  - The component psid shall be set equal to 0.
  - The component generationTime as defined in IEEE Std 1609.2.

- The component expiryTime shall be absent.
- The component generationLocation shall be absent.
- The component p2pcdLearningRequest shall be absent.
- The component missingCrlIdentifier shall be absent.
- The component encryptionKey shall be absent.
- The component inlineP2pcdRequest shall be absent.
- The component requestedCertificate shall be absent.

8.2.3. The ASN.1 module definition for the type Signature shall be as follows:

```
Signature ::= CHOICE {
    ecdsaNistP256Signature EcdsaP256Signature,
    ecdsaBrainpoolP256r1Signature EcdsaP256Signature,
    ...,
    ecdsaBrainpoolP384r1Signature EcdsaP384Signature
}
EcdsaP256Signature ::= SEQUENCE {
    rSig EccP256CurvePoint,
    sSig OCTET STRING (SIZE (32))
}
EccP256CurvePoint ::= CHOICE {
    x-only OCTET STRING (SIZE (32)),
    fill NULL, -- consistency with 1363/X9.62
    compressed-y-0 OCTET STRING (SIZE (32)),
    compressed-y-1 OCTET STRING (SIZE (32)),
    uncompressedP256 SEQUENCE {
        x OCTET STRING (SIZE (32)),
        y OCTET STRING (SIZE (32))
    }
}
```

- 8.2.4. The signing certificate shall be the certificate in the authorisation ticket that the C-ITS station is using for the transaction between the C-ITS station and the REDCR, in accordance with point 6 of ETSI TS 103 097-V1.3.1.
- 8.2.5. When receiving the message, the REDCR shall verify the certificate and shall use the public key included in that certificate to read the OWS data signature.
9. The application protocol and error handling for OWS data shall be the same as set out in points 5.6.2 and 5.7 of Appendix 14.
10. For stage 2, OWS data may also be served directly to the REDCR of the enforcer via the C-ITS station in the motor vehicle instead of via the DSRC-VU. In that case, the REDCR will also be a C-ITS station.

## ANNEX IV

**PERIODIC INSPECTIONS**

1. On-board weighing equipment ("OBW") shall undergo periodic inspections by weighing the vehicle or vehicle combination on certified weighing devices in accordance with Article 5(2)(b) of this Regulation, such as portable weigh pads or a weighbridge.
2. The following vehicles shall be subject to inspection:
  - a) motor vehicles;
  - b) trailers and semi-trailers featuring a trailer unit ("TU").
3. Trailers and semi-trailers subject to inspection according to point 2 shall undergo the inspection attached to a motor vehicle. Motor vehicles intended to tow semi-trailers shall undergo the inspection attached to a semi-trailer.
4. The periodic inspection shall consist of:
  - a) a three-load test, which shall be carried out two years after the registration of the vehicle and every four years thereafter;
  - b) a single-load test, which shall be carried out two years after the first three-load test and every four years thereafter.

Table 3

**Sequence of performance of the periodic inspections**

| Test                                                | Three-load | Single-load | Three-load | Single-load | Three-load | Single-load | Three-load | ... |
|-----------------------------------------------------|------------|-------------|------------|-------------|------------|-------------|------------|-----|
| Years after the date of registration of the vehicle | 2          | 4           | 6          | 8           | 10         | 12          | 14         | ... |

## 5. Three-load test

A three-load test shall be performed by loading the vehicle with three different loads, which values shall be calculated as follows:

- a) a load between 45 % and 55 % of the technically permissible maximum laden mass of the vehicle;
  - b) a load between 65 % and 75 % of the technically permissible maximum laden mass of the vehicle;
  - c) A load between 90 % and 100 % of the technically permissible maximum laden mass of the vehicle.
6. The single load test shall be performed by loading the vehicle with a load which is at least 90 % of the technically permissible maximum laden mass of the vehicle.
  7. For trailers and semi-trailers featuring a TU and for motor vehicles intended to tow a semi-trailer, the loads in points 5 and 6 shall be calculated in respect of the technically permissible maximum laden mass of the vehicle combination.
  8. Specific provisions for dynamic OBWs
    - 8.1. If the technically permissible maximum laden mass of the vehicle or vehicle combination exceeds the maximum authorised weight, the loads in points 5 and 6 shall be calculated in respect of the maximum authorised weight.
    - 8.2. In order to get a load value from the OBW, the vehicle or vehicle combination shall be driven over a certain distance under specific conditions to be specified in the manufacturer's guidelines.

9. The inspection shall be deemed to have failed when
  - a) the load value displayed by the OBW corresponding to the load between 90 % to 100 % of the technically permissible maximum laden mass referred to in point 5(c) does not conform to the values measured by the certified weighing device, with the level of accuracy set out in point 8 of Annex I, and
  - b) the load values displayed by the OBW corresponding to the loads between 45 % and 55 %, and between 65 % and 75 % of the technically permissible maximum laden mass as referred to in points 5(a) and 5(b), do not conform to the values measured by the certified weighing device with a level or accuracy of  $\pm 15$  %.
10. When the inspection fails the OBW shall undergo a new inspection no later than two months after the previous one.
11. Flexibilities for periodic inspections:

In order to facilitate the performance of periodic inspections for specific types of vehicles, and in order to reduce the impact of periodic inspections on the regular activities of drivers and hauliers, Member States may consider the application of the following flexibilities for vehicles registered in their territory:

- a) the three load values referred to in point 5 may be obtained over a period of three months;
  - b) the actual weighing of the vehicle may be carried out on certified weighing devices not belonging to the facilities of the OBW-workshops referred to in Article 5 of this Regulation, provided that the weighing operation is being supervised by a member of the staff of an OBW-workshop. The owner of the vehicle shall provide evidence to the OBW-workshop that the weighing has been performed on a certified weighing device;
  - c) for vehicles or vehicle combinations which specific configuration makes technically impossible to exceed the maximum authorised weight during normal use (e.g. road tankers) the loads referred to in points 5 and 6 may have other values; in the case of the three-load test, the difference between two consecutive loads shall be at least 15 % of the maximum authorised weight.
-