AIS-205

AUTOMOTIVE INDUSTRY STANDARD

Provisions ensuring uniform conditions for the implementation of interoperability and compatibility of on-board weighing equipment

PRINTED BY
THE AUTOMOTIVE RESEARCH ASSOCIATION OF INDIA
P.B. NO. 832, PUNE 411 004

ON BEHALF OF
AUTOMOTIVE INDUSTRY STANDARDS COMMITTEE

UNDER
CENTRAL MOTOR VEHICLE RULES – TECHNICAL STANDING COMMITTEE

SET-UP BY
MINISTRY OF ROAD TRANSPORT and HIGHWAYS

GOVERNMENT OF INDIA

March 2026

INTRODUCTION

0.1 The Government of India felt the need for a permanent agency to expedite the publication of standards and development of test facilities in parallel when the work on the preparation of the standards is going on, as the development of improved safety critical parts can be undertaken only after the publication of the standard and commissioning of test facilities. To this end, the erstwhile Ministry of Surface Transport (MOST) has constituted a permanent Automotive Industry Standards Committee (AISC) vide order No. RT-11028/11/97-MVL dated September 15, 1997. The standards prepared by AISC will be approved by the permanent CMVR Technical Standing Committee (CTSC). After approval, the Automotive Research Association of India, (ARAI), Pune, being the secretariat of the AIS Committee, has published this standard. For better dissemination of this information, ARAI may publish this document on their website.

0.2 MoRTH in its 61st meeting of CMVR-TSC, held on 17th May 2023, has directed AISC committee to initiate new AIS on the subject of vehicle on-board weighing, in line with European requirements.

The onboard weighment will address the issue of over loading from user side and will provide a means for real time check on vehicle load during inspections on road by RTAs.

This feature will also help in improving road safety and will avoid damages to road and vehicles those may be caused due to overloading.

0.3 This standard is based on the following European Regulation

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

0.4 While preparing this standard attempt has been made to align with the above regulation. However, certain changes were necessary in Indian context.

0.5 The following standards contain provisions, which through reference in this text constitute provisions of the standard

IS 14272:2011	Automotive Vehicles – Types – Terminology
AIS-004(Part 3)	Automotive Vehicles - Requirements for Electromagnetic Compatibility

0.6 The composition of AISC panel and AIS Committee responsible for preparation of this standard are given in Annex VI and Annex VII respectively.

Provisions ensuring uniform conditions for the implementation of interoperability and compatibility of on-board weighing equipment

Para. No.	Contents	Page No.
1.0	Scope	1/31
2.0	Definitions	1/31
3.0	Certification procedure	3/31
3.1	Application for approval	3/31
3.2	Modifications and extension of type approval	3/31
3.3	Electromagnetic Compatibility requirement	3/31
4.0	Periodic Inspections	3/31
5.0	OBW-Workshops	5/31
Annex I	General provisions for on-board weighing equipment ('OBW')	6/31
Appendix 1 to Annex I	Technical information to be submitted by vehicle manufacturer for type approval	9/31
Annex II	Specific provisions for Stage 2 OBW	10/31
Appendix 1 to Annex II	Security certification for Stage 2 OBW	12/31
Annex III	Data preparation and transfer of information to the REDCR	16/31
Annex IV	Periodic inspections	25/31
Annex V	Requirements for Outside Display Board	28/31
Annex VI	Composition of AISC Panel	29/31
Annex VII	Committee Composition of AISC	31/31

Provisions ensuring uniform conditions for the implementation of interoperability and compatibility of on-board weighing equipment

1.0 **SCOPE:** This standard applies to motor vehicles of categories N2, N3, T2, T3 and T4 as defined in IS 14272 as amended from time to time.

It 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 the requirements on maximum authorized weight.

This standard 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.

This standard also exempt Modular Hydraulic Trailer combination having provision of non-starting of vehicle combination in case of overloading.

2.0 **DEFINITIONS:** For the purpose of this standard following definitions shall apply

2.1 **'on-board weighing equipment' ('OBW')** means the equipment on-board a vehicle that is able to determine the total weight or the axle weight;

2.2 **'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;

2.3 **'axle weight' or 'axle load'** means the weight of a laden axle or group of axles as determined by the OBW, in kilogram;

2.4 **'calculated weight' or 'weight value'** means either the total weight or the axle weight, in kilogram;

2.5 **'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;

2.6 '**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;

2.7 '**dedicated short range communication vehicle unit' ('DSRC-VU')** means the 'remote early detection facility', as referred to in Appendix 14 to Annex IC to Regulation (EU) 2016/799, able to receive the OWS data from either the MVU or the C-ITS station and to send it to the REDCR;

Alternatively, OBW data transmitted by the DSRC-VU may be as per protocol referred in AIS-140 or IS 16833 Annex A as amended from time to time or through any other equivalent technologies/means as applicable.

2.8 **'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;

Alternatively, OBW data transmitted by the DSRC-VU may be as per protocol referred in AIS-140 or IS 16833 Annex A as amended from time to time or through any other equivalent technologies/means as applicable.

2.9 **'weight data**' means the raw data transmitted between elements of the OBW that must be processed in order to obtain the calculated weight;

2.10 '**on-board weighing system data' ('OWS data')** means the secured data of defined format requested by the REDCR from the DSRC-VU;

2.11 '**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;

2.12 **'cooperative intelligent transport systems station' ('C-ITS station')** means the C-ITS station within the meaning of supplementing Directive 2010/40/EU with regard to the deployment and operational use of cooperative intelligent transport systems, adopted on the basis of Article 6(1) of that Directive;

2.13 '**address assignment phase'** means the preliminary phase of electronic communication between vehicles of a vehicle combination whereby a position is assigned to each vehicle.

2.14 '**on-board weighing equipment workshop' ('OBW-workshop')** means a workshop authorised by a State Government / Union Territory Government to perform inspections of on-board weighing equipment.

2.15 '**vehicle type with regard to its On-board weighing equipment'** means a category of vehicles which do not differ in such essential respects as:

(a) The manufacturer's trade name or mark;

(b) Vehicle features which significantly influence the performances of the On-board weighing equipment;

(c) The type and design of the On-board weighing equipment.

3.0 CERTIFICATION PROCEDURE

3.1 **Application for approval:** Apart from documentation to be submitted to the testing agencies as per this standard, Technical specifications as per Appendix 1 to Annex 1 of this standard shall be submitted.

3.2 **Modifications and extension of type approval**

3.2.1 Every modification of vehicle type as defined in clause no. 2.15 of this Standard shall be notified to the Testing Agency which approved the on-board weighing equipment installed in vehicles or vehicle combinations. The Testing Agency may then either:

3.2.1.1 consider that the modifications made are unlikely to have an appreciable adverse effect and that in any case the OBW still complies with the requirements; or

3.2.1.2 require a further test report from the testing agencies responsible for conducting the tests.

3.2.2 In case of 3.2.1.2 tests shall be carried out for only those parameters which are affected by the modifications.

3.2.3 In case of fulfilment of criteria of Para. 3.2.1.1 or after successful results of further verification as per para 3.2.1.2 the approval of compliance shall be extended for the changes carried out.

3.3 The effectiveness of OBW Systems with respect to EMI/EMC shall be demonstrated by fulfilling the technical requirements of AIS-004 (Part 3) as amended from time to time.

4.0 PERIODIC INSPECTIONS

4.1 On-board weighing equipment shall be subject to a periodic inspection by an OBW-workshop every two years for vehicles upto eight years old and every year for vehicles older than eight years following its installation in the vehicle or vehicle combination.

4.2 Periodic inspections shall be performed in accordance with Annex IV.

4.3 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.

4.4 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.

4.5 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 result (Pass/Fail);

(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 calibration of the certified weighing device used for the periodic inspection.

(h) unique QR code containing link for verification of authenticity of inspection report by competent authority.

(i) Vehicle photograph along with Geo-tagging i.e. latitude and longitude of OBW-workshop where periodic inspection is performed.

4.6 In States / Union Territories where ATS are established and functional, after completion of periodic inspection test in OBW-workshop, inspection report of the vehicle shall be uploaded on VAHAN database automatically and softcopy of the inspection report shall be sent to registered vehicle owner on email id. Inspection report shall be digitally signed by the in-charge of OBW-workshop.

In States / Union Territories where ATS are yet to be established, inspection reports shall be retained for a minimum period of two years for vehicles upto eight years old and for a minimum period of one year for vehicles older than eight years from the time the report prepared by OBW-workshop.

In cases where the inspection reports are kept by the OBW-workshop, the reports of inspections and calibrations carried out during that period shall be made available upon request from the competent authority. This situation holds good for those cases wherein ATS facilities are yet to be established/not available.

5.0 OBW-WORKSHOPS

5.1 Testing agencies notified under CMV Rule 126 shall approve, regularly audit and certify the OBW-workshops allowed to perform inspections of on-board weighing equipment.

5.2 States Governments / Union Territory Government 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 or Directive 2014/32/EU;

(c) the workshops are of good repute.

5.3 OBW-workshops shall be subject to the following audits:

(a) at least every two years, to an audit performed by a supervising body on the procedures applied when handling on-board weighing equipment. The audit of OBW-workshop shall be carried out in accordance with the provisions of CMV Rule 184(4) as applicable.

(b) unannounced technical audits may also take place in order to check the installations, inspections and, where appropriate, calibrations carried out.

5.4 States Governments / Union Territory Government 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.

5.5 The testing agencies notified under CMV Rule 126 shall publish on their websites an updated list of OBW-workshops approved by them, 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.

5.6 The testing agencies notified under CMV Rule 126 shall withdraw approvals, either temporarily or permanently, from OBW-workshops which fail to meet their obligations under this standard.

ANNEX I

GENERAL PROVISIONS FOR ON-BOARD WEIGHING EQUIPMENT ('OBW')

1.0 General provisions

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

(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.

Either static or dynamic method shall be assessed for compliance based on discretion of vehicle manufacturer.

1.2. The implementation of this standard follows two stages:

(a) Stage 1 – OBW data transfer internally (vehicle unit to DSRC)

(b) Stage 2 - OBW data transfer externally (DSRC to REDCR-external authority)

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.

2.0 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;

3.0 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.

4.0 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.

5.0 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.

6.0 **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.

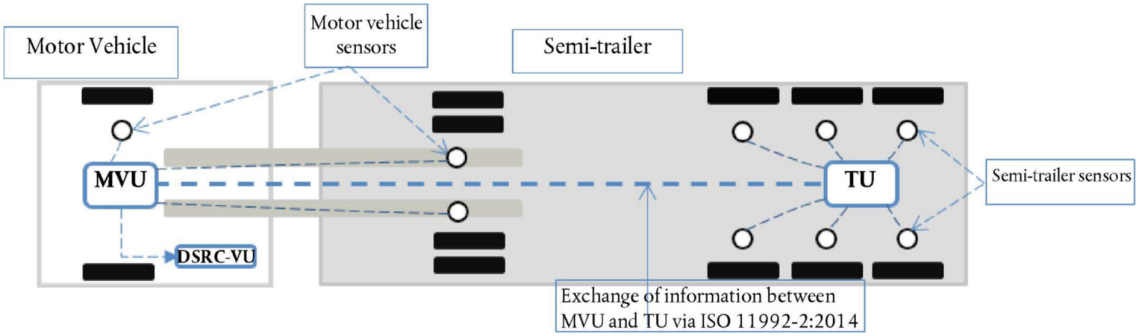

Figure 1

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

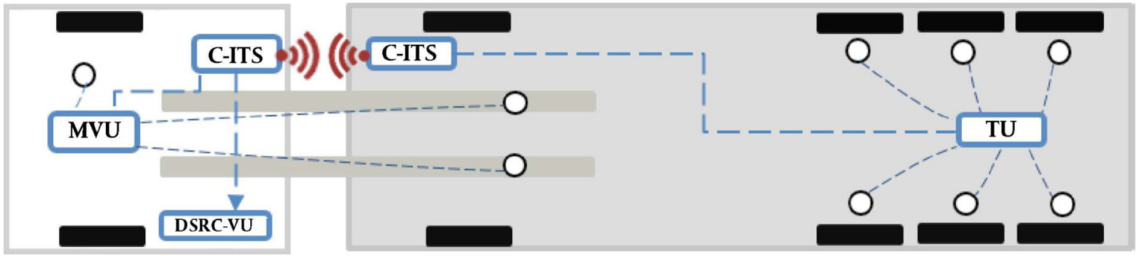

Figure 2

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

7.0 **Weight information to the driver**

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

7.1 At the choice of manufacturer weights information may be displayed on outside of the vehicle.

7.2 In case LED Outside Display Board is provided for compliance to Clause No. 7.1, then requirements stipulated in Annex V shall be complied.

8.0 **Accuracy**

8.1 The accuracy of the calculated weight shall be ± 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 ± 10 % or better.

APPENDIX 1 to ANNEX 1

(See 3.1)

TECHNICAL INFORMATION TO BE SUBMITTED BY VEHICLE MANUFACTURER FOR TYPE APPROVAL

1.0	Name and address of vehicle manufacturer
2.0	Vehicle model and its variant(s)
3.0	Vehicle overall dimensions, (length, width and height), mm
4.0	Whether alternative method used for Modular Hydraulic Trailer combination, which does not allow movement of the combination in case of overloading (Yes/no)
5.0	HMI features

ANNEX II

SPECIFIC PROVISIONS FOR STAGE 2 OBW

1.0 This Annex applies exclusively to stage 2 OBW.

2.0 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.

3.0 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.

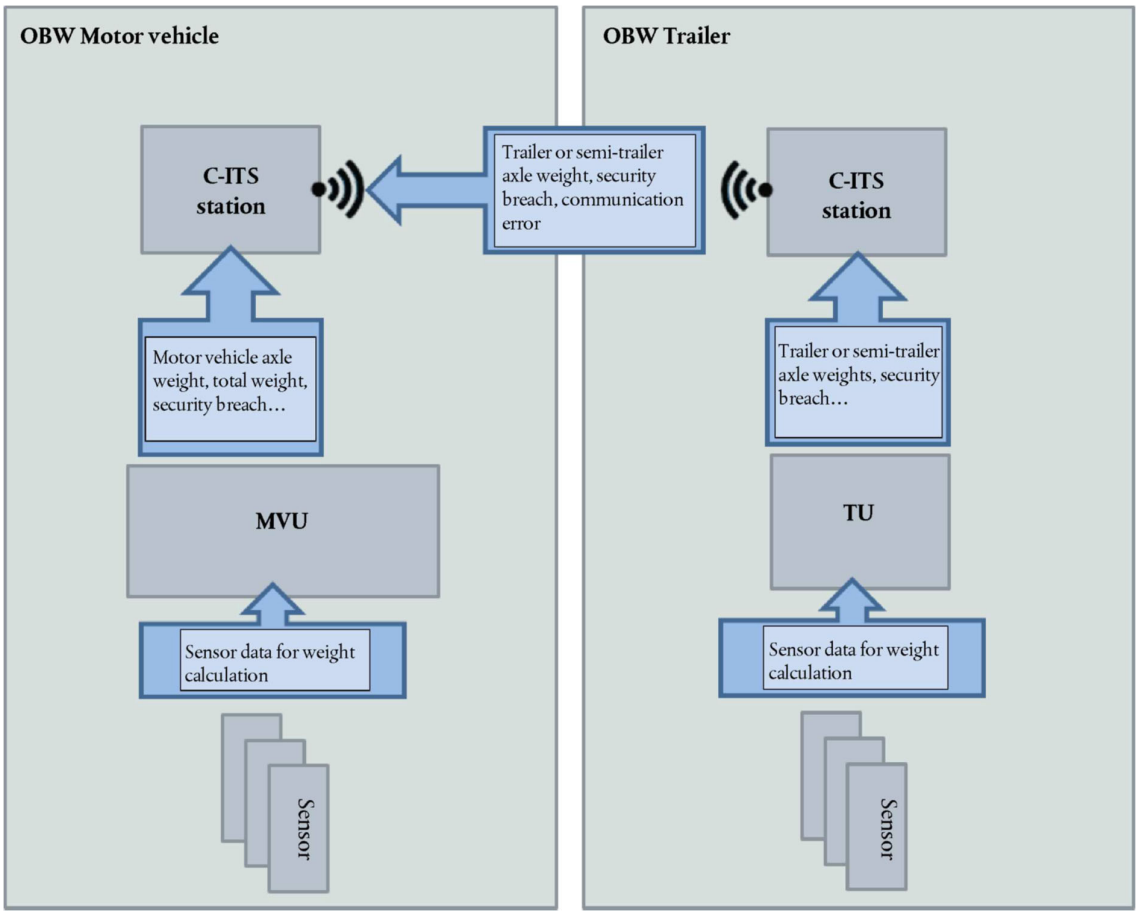

Figure 3
Example of flow of messages in a stage 2 OBW

4.0 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.

5.0 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 Cooperative Intelligent Transport Systems, 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.

APPENDIX 1 TO ANNEX II

SECURITY CERTIFICATION FOR STAGE 2 OBW

1.0 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'.

2.0 The minimum security requirements to be met by OBW-VU shall be defined in a Security Target ('ST') according to the Common Criteria Scheme.

3.0 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).

4.0 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.

5.0 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 Clause No. 4 of Annexure II of AIS-059 amended from time to time.

6.0 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.

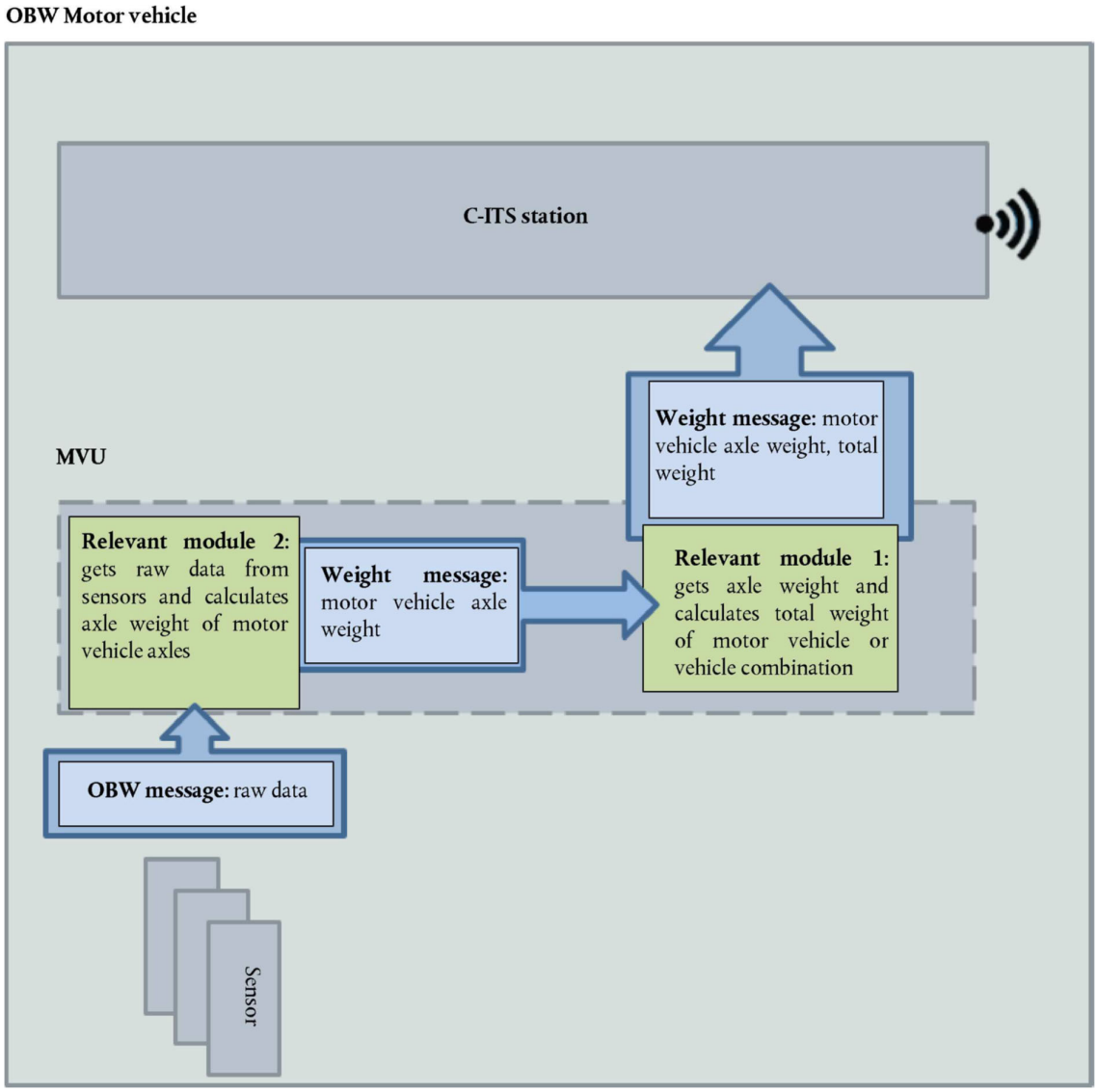

Figure 4

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

7.0 Threats to be addressed in the ST : The ST shall address the following threats:

(a) T.OBW-VU_message_spoof: an attacker could spoof OBW-VU messages so that the OBW-VU miscalculates the total or axle weight.

(b) T.OBW-VU_message_tamper: an attacker could tamper OBW-VU messages so that the OBW-VU miscalculates the total or axle weight.

(c) T.Weight_message_spoof: an attacker could spoof weight messages so that the weight calculated by the OBW-VU is modified.

(d) T.Weight_message_tamper: an attacker could tamper weight messages so that the weight calculated by the OBW-VU is modified.

(e) T.Audit_spoof: an attacker could spoof audit information messages.

(f) T.Audit_tamper: an attacker could tamper audit information messages.

(g) 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.

8.0 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.

9.0 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

1.0 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').

Alternatively, OBW data transmitted by the DSRC-VU may be as per protocol referred in AIS 140 or IS 16833 Annex A as amended from time to time or through any other equivalent technologies/means as applicable.

2.0 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.

OBW Motor Vehicle

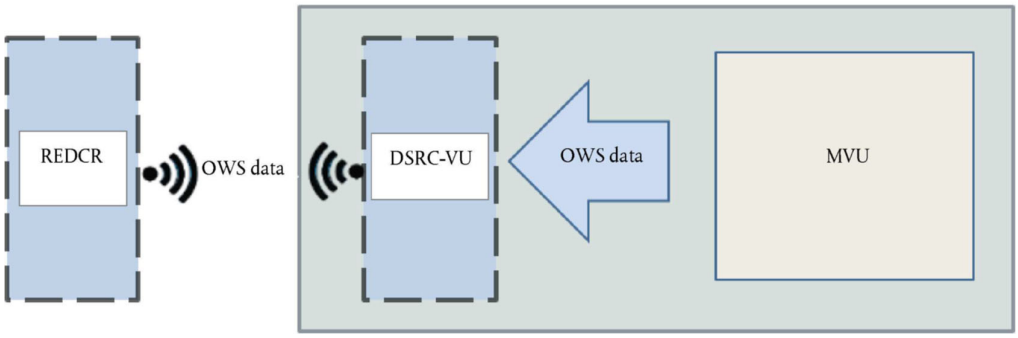

Figure 5

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

3.0 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.

OBW Motor Vehicle

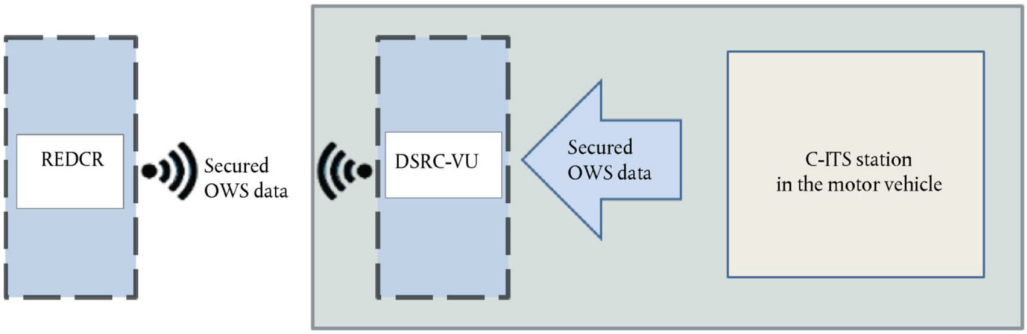

Figure 6

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.

4.0 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.

5.0 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 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.

6.0 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,  DSRCApplicationEntityID,  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
```

7.0 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

OWS Data element	Action performed by the C-ITS station in the motor vehicle	Comment	ASN.1 definition of data
OWS1 Total weight	An integer value shall be generated.	Last measured total weight	Recorded Weight INTEGER (0..65535),
OWS2 technically permissible maximum laden mass	An integer value shall be generated	Technically permissible maximum laden mass declared by the manufacturer	Maximum Technical Weight INTEGER (0..65535)
OWS3 Axles configuration of the vehicle	An octet string size 4 shall be generated.	Axles configuration	Axles Configuration OCTET STRING SIZE (4),
OWS4 Axle weight	An octet string size 26 shall be generated.	Weight per axle	Axles Recorded Weight OCTET STRING SIZE (26),
OWS5 Time recorded total weight	An integer value shall be generated. The value for OWS2 shall be set to the time of the current record of total weight.	Timestamp of the current recorded weight	tp15638Timestamp INTEGER (0..4294967295),
OWS6 DSRC Communication error	A Boolean value shall be generated. A TRUE value to the tp15638DSRC communication Error 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. 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, BOOLEAN,

OWS7 OBW Communication error	A Boolean value shall be generated. A TRUE value to the tp15638Communi- cation Error variable shall be assigned if the OBW has encountered at least one OBW communication error event inside the OBW in the last 30 days. 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	tp15638OBWCommu nicationError, BOOLEAN,
OWS8 Security Breach Attempt	A Boolean value shall be generated. A TRUE value to the tp15638 Security- Breach Attempt variable shall be assigned if the OBW has in the last 2 years re- corded at least one event of type security breach attempt. 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	tp15638SecurityBreach Attempt BOOLEAN,

where		
a)	Recorded Weight 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)	Axles Configuration 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 axles Recorded Weight 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/ 10/11	00/01/ 10/11	00/01/ 10/11	00/01/ 10/11	00/01/ 10/11	00/01/ 10/11	00/01/ 10/11	00/01/ 10/11	00/01/ 10/11	00/01/ 10/11	00/01/ 10/11	00/01/ 10/11	00/01/ 10/11	RFU (6 bits)

a)	axles Recorded Weight 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 1500 kgs.
b)	maximum Technical Weight 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.

8.0 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 Signed Data referred to in point 5.2 of ETSI TS 103 097-V1.3.1 shall have the following constraints:

a) The type Hash Algorithm shall be set at sha256

b) The type Signer Identifier shall be set at ‘digest’.

c) The type Signed Data Payload shall be the OWS data as laid down in point 7.

d) The type Header Info shall be constrained to have the following security headers:

- The component psid shall be set equal to 0.
- The component generation Time as defined in IEEE Std 1609.2
- The component expiry Time shall be absent.
- The component generation Location shall be absent.
- The component p2pcd Learning Request shall be absent.
- The component missing Crl Identifier shall be absent.
- The component encryption Key shall be absent.
- The component inlineP2pcdRequest shall be absent.
- The component requested Certificate 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.

9.0 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.

10.0 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

1.0 On-board weighing equipment ('OBW') shall undergo periodic inspections by weighing the vehicle or vehicle combination on certified weighing devices in accordance with Clause No. 5.2 (b) of this standard, such as portable weigh pads or a weighbridge.

2.0 The following vehicles shall be subject to inspection:

a) motor vehicles;

b) trailers and semi-trailers featuring a trailer unit ('TU').

3.0 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.

4.0 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 for upto eight years old vehicles and thereafter every two years for vehicles older than eight years;

b) a single-load test, which shall be carried out two years after the first three-load test and every four years thereafter for upto eight years old vehicles and thereafter every two years for vehicles older than eight years.

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	9	10	11	...

5.0 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.

6.0 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.

7.0 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.

8.0 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.

9.0 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 ± 15 %.

10.0 When the inspection fails the OBW shall undergo a new inspection no later than two months after the previous one.

11.0 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, Registering authorities may consider the application of the following flexibilities for vehicles registered in their area of jurisdiction:

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 Clause 5 of this standard, 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.

ANNEX V

Requirements for Outside Display Board

1.0 Outside Display Board for Commercial vehicles of N2 and N3 categories

1.1 Minimum of two Outside Display boards shall be provided with at least one each on front, and the driver door side of the vehicle.

1.2 The minimum dimensions of the Outside Display board shall be as given below:

Table 1

Location	Height	Width
Front	200 mm	900 mm
Driver Door Side	200 mm	900 mm

Note: The Outside Display boards should be located in such a manner that they do not hit the head of driver while ingress or egress. Also the front Outside Display board should not hamper the driver's vision. Preferably, the Outside Display boards should be accommodated in the structure of the vehicle so that no part of the Outside Display board protrudes out and becomes a concern for occupant or road user's safety.

1.3 The Outside Display board shall be illuminated in such way that the whole of the Outside Display board and the writing thereon are legible at a minimum distance of 30 metres.

2.0 Requirements

Requirements, Construction & Tests for LED Outside display board shall comply with Clause Nos. 4, 5 & 6 of IS 16490: 2016 as amended from time to time.

ANNEX VI

(See Introduction)

COMPOSITION OF AISC PANEL *

Automotive Industry Standards Sub Committee on On-board weighing

Panel convener	**Representing**
Dr. Prashant R. Pawar	ARAI
Members	
Mr. Jitendra Patil	Transport Commissioner Office
Mr. Bhor Sanjeev	Transport Commissioner Office
Mr. Tejaunsh Nyati	Transport Commissioner Office
Mr. Vishal P. Rawal	The Automotive Research Association of India
Mr. Virendra S. Kuwar	The Automotive Research Association of India
Mr. S. S. Gawade	The Automotive Research Association of India
Ms. Shubhangi Dalvi	Central Institute of Road Transport
Ms. Rupali Lokhande	Central Institute of Road Transport
Mr. Dhanasekkar V. M.	Global Automotive Research Centre
Mr. S. Perumal	Global Automotive Research Centre
Mr. Mohammed Suhail	Global Automotive Research Centre
Mr. Rohit Yadav	International Centre for Automotive Technology
Mr. Gavendra Singh	International Centre for Automotive Technology
Mr. V. Faustino	SIAM (Ashok Leyland Ltd.)
Mr. Ved Prakash Gautam	SIAM (Ashok Leyland Ltd.)
Mr. Ganesan Sethuraman	SIAM (Daimler India Commercial Vehicle.)
Mr. Girish S. Kodolikar	SIAM (Force Motors Ltd.)
Mr. Kulkarni Varadendra	SIAM (Mahindra Truck & bus Division)
Mr. Shailesh Kulkarni	SIAM (Mahindra & Mahindra Ltd.)
Mr. Amit Patil	SIAM (Mahindra Truck & bus Division)
Ms. Pathak Pushpanajali	SIAM (Mahindra & Mahindra Ltd.)
Mr. Jadhav Kishor	SIAM (Mahindra & Mahindra Ltd.)

Mr. Raj Kumar Dwivedi	SIAM (Maruti Suzuki India Ltd.)
Mr. Chandran Manoj Prabagar	SIAM (Maruti Suzuki India Ltd.)
Mr. P. S. Gowrishankar	SIAM (Tata Motors Ltd.)
Mr. Sharad S. Bhole	SIAM (Tata Motors Ltd.)
Mr. Arun Solunke	SIAM (Tata Motors Ltd.)
Mr. Ravindra Mehendale	SIAM (Tata Motors Ltd.)
Mr. Premlal P	SIAM (Tata Motors Ltd.)
Mr. Dileep Rao	SIAM (VE Commercial Vehicles Ltd.)
Mr. Nithin Roy	SIAM (Volvo Trucks India -VECV)
Mr. Nithin	SATRAC
Mr. Sanjay Tank	ACMA
Ms. Alka Sharma	ACMA (DIIN)
Mr. S Murugesan	ACMA (Brakes India Ltd.)
Mr. Gitesh Mutha	ACMA (Uno Minda)
Mr. Sachin Deshmukh	ACMA (ZF India Pvt. Ltd.)
Mr. N Shanmugasundaram	ACMA (ZF Group)
Mr. Shomjit Sinha	Jost World
Mr. Saurav Kumar	Jost World
Mr. Srivastava Sudeep	Jost World

* At the time of approval of this Automotive Industry Standard (AIS)

ANNEX VII

(See Introduction)

COMMITTEE COMPOSITION *

Automotive Industry Standards Committee

Chairperson	
Dr. Reji Mathai	Director, The Automotive Research Association of India
Members	**Representing**
Representative from	Ministry of Road Transport and Highways
Representative from	Ministry of Heavy Industries
Representative from	Office of the Development Commissioner, MSME, Ministry of Micro, Small and Medium Enterprises
Shri Shrikant R. Marathe	Former Chairman, AISC
Head TED	Bureau of Indian Standards
Director	Central Institute of Road Transport
Director	Global Automotive Research Centre
Director	International Centre for Automotive Technology
Director	Indian Institute of Petroleum
Director	Vehicles Research and Development Establishment
Director	Indian Rubber Manufacturers Research Association
Representatives from	Society of Indian Automobile Manufacturers
Representative from	Tractor and Mechanization Association
Representative from	Automotive Components Manufacturers Association of India
Representative from	Indian Construction Equipment Manufactures' Association
Member Secretary	
Shri Vikram Tandon	The Automotive Research Association of India

* At the time of approval of this Automotive Industry Standard (AIS)