The Minister for Infrastructure and Transport

HAVING REGARD TO Legislative Decree No 285 of 30 April 1992 on the 'New Highway Code', hereinafter referred to as the 'Code';

HAVING REGARD TO *Presidential Decree No 495 of 16 December 1992 on the 'Regulations for the execution and implementation of the new Highway Code', hereinafter referred to as the 'Regulations';*

HAVING REGARD TO Article 3(2) of Law no. 190 of 13 June 1991, which entrusts the Ministers responsible for the subject matter with the adoption of regulations for the execution and implementation of the provisions of the Code that fall within their exclusive competence;

HAVING REGARD TO Article 201(1-bis)(f) of the Code;

HAVING REGARD TO Article 35 of the Code, which defines the powers to issue directives for the organisation of traffic and the related road signs and establishes the criteria for traffic planning to be followed by the road-owning entities as well as for adapting, by means of decrees of the Minister of Infrastructure and Transport, the rules of the Regulations to the relevant EU directives and international agreements

HAVING REGARD TO Article 45 of the Code, which regulates, inter alia, the approval or type-authorisation by the Ministry of Infrastructure and Transport of devices, equipment and other technical means suitable for the detection and automatic detection of violations of traffic regulations, subject to verification of their geometric, photometric, functional and suitability characteristics and any other specific requirements

HAVING REGARD TO Rule 192 of the Rules of Procedure, which governs the procedures for approval and type-authorisation;

HAVING REGARD TO annex A of Prime Ministerial Decree no. 72 of 3 March 2011, which sets the time limit for the conclusion of the type-authorisation procedure at one hundred and eighty days

HAVING REGARD TO Decree No 282 of the Minister of Infrastructure and Transport of 13 June 2017, which regulates, inter alia, the procedures for the initial and periodic calibration checks of devices, equipment and technical means for the detection of violations of maximum speed limits and, in particular, Article 1;

HAVING REGARD TO the Decree of the Minister of Infrastructure and Transport, adopted in agreement with the Minister of the Interior of 12 April 2024, no. 105, which regulates the methods of placement and use of devices or technical means of control, aimed at the remote detection of breaches of the rules of conduct referred to in Article 142 of the Code

HEARING Accredia as the only national body authorised to carry out accreditation activities pursuant to the Decree of the Minister for Economic Development of 22 December 2009, adopted in agreement with the Ministers for the Interior, Agricultural and Forestry Policies, the Environment and Protection of Land and Sea, Infrastructure and Transport, Labour and Social Policies, Health, Education, University and Research, and Defence

TAKING INTO ACCOUNT the findings that have emerged in the context of the work of the Technical Table established with the Ministry of the Interior, the Ministry of Business and Made in Italy and ANCI, on the approval and type-authorisation of all instrumental devices for the remote detection of traffic violations, established by note of the Chief of Cabinet prot. no. 33115 of 6 September 2024;

HAVING REGARD TO the opinion expressed by the Ministry of Enterprise and Made in Italy in note prot. no. 5855 of 18 March 2025

HAVING REGARD TO Note no. XXXX of ..... with which the Ministry of Enterprise and Industry informed the European Commission on ..... no. XXXX/I of the draft standard prepared by the Ministry of Infrastructure and Transport governing the type-authorisation of technical control equipment and devices for detecting speed limit violations

HAVING ASSESSED the need to intervene in order to resolve the critical issues of interpretation and application arising from the divergent jurisprudence of the courts of first and second instance, particularly with regard to the use of devices or instruments to control the violation of speed limits;

CONSIDERED also in the light of the findings of the technical round table, the need to establish unambiguous requirements to which all devices and systems must conform when carrying out measurements to ascertain violations of speed limits, in accordance with the combined provisions of Articles 45 and 142, paragraph 6, of the code as well as Article 192 of the Regulations

CONSIDERED that by note n. XXXX of ....., the Ministry of Business and Made in Italy informed that in the period of three months since the draft standard was notified to the European Commission pursuant to Legislative Decree No 223 of 15 December 2017, no comments were received from EU Member States;

HEREBY DECREES:

Article 1
(Subject matter and scope)

1. This decree defines the characteristics, requirements and procedures for the type-authorisation of the prototype, calibration and functionality checks of the devices, equipment and technical means referred to in Article 201(1-bis)(f) of the Code for the detection of violations of the maximum speed limits pursuant to Article 142 of the Code.
2. The type-authorisation of the prototype is carried out in order to ascertain that the devices or systems are suitable as speed measuring devices and meet the requirements of Annex A, which forms an integral part of this decree.

Article 2
(Type-authorisation)

1. Upon the positive outcome of the verification of the conditions set forth in Article 1, the Ministry of Infrastructure and Transport issues the prototype type-authorisation decree, which is communicated to the manufacturer and published on the institutional website of the same Ministry.

Article 3
(Characteristics and requirements of control devices and systems)

1. For each device or system subject to type-authorisation, the characteristics are set out in the device identification table in Chapter 1 of Annex A.

Article 4
(Calibration; initial and periodic functionality checks)

1. Calibration and initial and periodic functional checks shall be carried out to ensure that each unit of the device or system with a measuring function meets the requirements for speed measurement and maintains the performance required in Chapter 2 of Annex A throughout its service life.
2. In the event of negative calibration results, the device cannot be used until a new initial or positive periodic calibration.
3. In the event of a negative outcome of the functionality checks, the device cannot be used until the checks are successful.

Article 5
(Conformity checks)

1. Conformity checks on the manufacture of equipment, as referred to in Article 192(8) of the Regulation, shall be carried out by bodies specifically accredited and authorised by the Ministry of Infrastructure and Transport by means of a subsequent decree issued by the competent Directorate-General of the Ministry of Infrastructure and Transport.
2. For the purposes of this Article, bodies shall perform:
   a) the verification of the conformity control system of the production process carried out by the manufacturer at the facilities in case ISO 9001 certification is not available;
   b) verification of the conformity of the product to the approved type at the manufacturer's premises, at its sales network, and at the distribution network;
3. The choice of random samples for verification and the minimum number of samples for verification, as referred to in subsection 2 lit. b), is determined on the basis of the results of the manufacturer's own checks.
4. The audits, referred to in paragraph 2 lit. b), are carried out once every three years, if ISO 9001 certification is available; otherwise, the audit is carried out once a year.
5. The verifications, referred to in para. 2 lit. b), are included among those provided for at the time of type-authorisation and described in the technical report referred to in item 1.31 of Annex A.

Article 6
(Transitional provisions)

1. Devices or systems approved in accordance with the provisions of Decree no. 282 of the Minister of Infrastructure and Transport of 13 June 2017, being in compliance with the provisions of Chapter 1 of Annex A, shall be deemed to be type-approved under this Decree. The list of approval decrees is included in Annex B.
2. The holder of the approval of a device or system approved prior to the entry into force of the Decree of the Minister of Infrastructure and Transport no. 282 of 13 June 2017 may apply for type-authorisation by supplementing the documentation, submitted at the time of approval, in accordance with Chapters 1 and 3 of Annex A, with the exception of the testing provided for therein, within the period of six months from the entry into force of this Decree. The holder of the approval of a device or system referred to in the first sentence, already in possession of suitable documentation demonstrating compliance with the calibration requirements and laboratory tests required by Chapter 1 of Annex A, may forward it within thirty days to the Ministry of Infrastructure and Transport, which shall express its opinion within the following sixty days, adopting, in the event of a positive verification, the relative type-authorisation decree.
3. The provisions relating to the periodic calibration set out in Chapter 2 of Annex A shall apply upon the expiry of the calibration certificate issued pursuant to Ministry of Infrastructure and Transport Decree no. 282 of 13 June 2017 with which each individual device or system is provided, from the date of entry into force of this Decree.

4. Devices or systems not included in Annex B are decommissioned on the date of entry into force of this decree. They may be duly activated, subject to the issuance of the type-authorisation decree pursuant to subsection 2.
5. Devices or systems that comply with the provisions of the Decree of the Minister of Infrastructure and Transport of 13 June 2017, prot. no. 282, and for which, on the date of publication of this Decree, applications for approval have been submitted, shall be examined as applications for type-authorisation under this Decree.
6. Applications for extension of approval of devices or systems, approved after the entry into force of the aforementioned Decree of the Minister of Infrastructure and Transport of 13 June 2017, already submitted on the date of publication of this Decree, shall be considered as applications for extension of approvals within the meaning of Article 6(1). Applications for the extension of approval of devices or systems, approved prior to the entry into force of the aforementioned Decree of the Minister of Infrastructure and Transport of 13 June 2017, already submitted on the date of publication of this Decree, may obtain type-authorisation using the procedures set out in Article 6(2).

Article 7
(*Annulments*)

1. The Decree of the Minister of Infrastructure and Transport of 13 June 2017, Prot. no. 282, published in the Official Gazette no. 177 of 31 July 2017, is repealed one year after the entry into force of this Decree, with the exception of Chapter 7 of the Annex.

This Decree has been published in the Official Gazette of the Italian Republic.

THE MINISTER

The Ministry for Infrastructure and Transport

ANNEX A

Characteristics, requirements and procedures for type-authorisation, calibration and verification of functionality of devices and systems for detecting violations of maximum speed limits pursuant to Article 142 of the Highway Code

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DEFINITIONS

SUBJECTS

1. **MIT**: The Ministry for Infrastructure and Transport

2. **PRODUCER:** Producer means the holder of the type-authorisation, which may be one of the following entities:
   - the manufacturer of the device or system;
   - the importer and/or distributor of the device or system;
   - the manufacturer's representative;

3. **TYPE-AUTHORISATION OFFICER:** subject, alternatively between manufacturer and distributor, who applies to the MIT for type authorisation/extension of the device. If the proceedings are successful, he obtains the probate/extension decree in his name;

4. **USER:** the police body entitled to use the devices or systems for control purposes and in the manner defined in the Code and its Regulations.

5. **Testing Laboratory**: an entity operating in compliance with the requirements of ISO IEC 17025:2017 (and subsequent revisions) as a testing laboratory, accredited by ACCREDIA or other accreditation bodies that are international signatories of mutual recognition agreements for the specific test. MIT recognises certificates and reports issued in Italian or English; for other languages, a sworn translation is required.
6.

7. **LAT (Calibration Laboratory):** an entity operating in compliance with the requirements of the standard UNI CEI EN ISO/IEC 17025 (and subsequent revisions) as a calibration laboratory, accredited by ACCREDIA or other accreditation bodies that are international signatories to mutual recognition agreements for the specific quantity and measurement range being calibrated. MIT recognises certificates and reports issued in Italian or English; for other languages, a sworn translation is required.

DEVICES

8. **DEVICE**: any instrument, apparatus or technical means of control, used to detect the speed of vehicles.

9. **SYSTEM: a** set of devices, used in two or more locations, aimed at detecting the average speed on a road section;

10. **DEVICE NAME**: Commercial name of the device, which uniquely identifies it, declared when applying for type-authorisation/ extension.

11. **MODEL CODE**: For each device, the code that specifically identifies a version/model.

12. **SERIAL NUMBER:** alphanumeric identification sequence, assigned in a unique way to distinguish one specimen from a series.

13. **DEVICE IDENTIFICATION TABLE**: an identity card of the device whose purpose is to unambiguously identify all its features, modes and functions.

14. **MANAGEMENT SOFTWARE**: Software contained in the device, which is necessary to guarantee the complete operation of the device, including the calculation of speed and, for example, the management of hardware resources, the execution of the main functions and interfacing with any additional components or applications. Ancillary software components such as violation display, operator interfaces, graphical interfaces are excluded.

15. **SOFTWARE MODULE INHERENT TO THE RELEVANT MEASURE:** Software module responsible for calculating the speed measurement, identifiable by the HASH code.

16. **RELEVANT MEASUREMENT PARTS (GROUP 1):** components (HW and SW) of the device that contribute to the determination of the speed measurement. The following is an illustrative and non-exhaustive list:
    - radar sensor;
    - laser sensor;
    - magnetic coils;
    - stereoscopic cameras;
    - speed calculation software module.

17. **PARTS NOT INHERENT TO THE RELEVANT MEASUREMENT THAT CONTRIBUTE TO THE CORRECT RECOGNITION OF THE VIOLATION (GROUP 2):** components (HW and SW) of the device that do not contribute to the determination of the speed measurement, but are decisive for the correct detection of the violation. The following is an illustrative and non-exhaustive list:
    - OCR camera;
    - context camera;
    - illuminator;

- sensor classifier;
- protective case.

18. **PARTS NOT INHERENT IN THE RELEVANT MEASURE WHICH DO NOT CONTRIBUTE TO THE CORRECT ACQUISITION OF THE VIOLATION (GROUP 3):** Device components that do not contribute to the determination (group 1) and acquisition (group 2) of the violation. For these components, no notification to MIT is required for any replacement, provided that it is made with components having the same or better performance than the replaced component.

19. **PROTOTYPE**: Prototype means:
    - in the case of instantaneous speed measurement, the device in its invariant configuration, which concentrates in itself the essential functions aimed at detecting the violation, including the speed calculation software;
    - in the case of average speed measurement, the system in its invariant configuration, which concentrates in itself the essential functions aimed at detecting the violation, including the software for calculating the average speed, which can be replicated indefinitely to make up the system.

    Adaptations for road use made necessary by local conditions of use (e.g. brackets, poles, portals, etc.) are excluded from the prototype.

    The prototype must be equipped with the parts referred to in definitions 14 to 18, which must be made explicit during type-authorisation.

MIT MEASURES

20. **PROTOTYPE AUTHORISATION:** procedure through which the MIT ascertains on a documentary basis the compliance of the device and/or system with the provisions and requirements of these regulations. In the event of a positive outcome, the procedure ends with the issuing of a managerial decree allowing the use, on national territory, of all devices conforming to the type-approved prototype for the purpose of ascertaining violations of instantaneous and/or average speed limits.

21. **AUTHORISATION EXTENSION:** procedure through which the MIT approves new and different models and versions of the prototype, following the modification and/or addition of one or more components or functions of an already type-approved device. The MIT verifies, for modified and/or added components, the fulfilment of the requirements defined in this document. The extension is made official through a management decree. In the case of an extension of type-authorisation, the opinion of the Consiglio Superiore dei Lavori Pubblici can also be used.

22. **TAKE OVER OWNERSHIP OF THE TYPE-AUTHORISATION**: procedure by means of which the MIT authorises a change in the ownership of type-authorisation and any subsequent extensions.

CHARACTERISTICS

23. **SHORT BASIS**: Section of road within which the device performs the point speed measurement of vehicles.

24. **EXTENDED BASE**: Section of road within which the system measures the average speed of vehicles.

25. **POINT-TO-POINT OR INSTANTANEOUS SPEED DETECTION DEVICES**: Devices used to ascertain the point speed of a vehicle by measuring speed on a short basis.

26. **AVERAGE SPEED DETECTOR SYSTEM**: A system used to ascertain the average speed of a vehicle on an extended base of known length. Excluded from this discussion is the system based on the chronological entries stamped on motorway tickets when the toll is issued and collected.

27. **MODE OF OPERATION:**
    - **Manual:** mode of operation of the device that necessarily requires the presence and intervention of the operator who controls the methods of installation, detection, verification;
    - **Automatic:** A device or system that, according to the type-authorisation conditions, operates automatically;

28. **CONTROL STATION**

    A control station (or station) is defined as the assembly consisting of the device, or several devices relating to the same detection section, and the other complementary components, such as, but not limited to, guards, boxes, supports, vehicles of the traffic police, necessary for the operation of the devices. Average speed detection systems consist of two control stations (start and end). The end control station can be used as the start control station, at different times, for the next extended base.

29. **TYPES OF LOCATION**:

    - **mobile**: when the devices are installed in temporary activation mode in a variable or predetermined location on the road infrastructure; devices installed in such locations may be held by traffic police officers or housed inside vehicles parked outside the carriageway, or placed on stands or in removable structures or not placed outside the carriageway; for such devices, the supervision, even if only at a distance from the device, by traffic police officers is required during the investigation of the violation;
    - **fixed**: when the devices are installed in a specific location, placed at a precise point on the road infrastructure; for these devices, automatic operation is

possible without the need for the police to be present when the violation is detected; fixed locations include those permanently equipped for the installation of the devices, even if only temporarily;

- **manned**: fixed or mobile location at which the traffic police operator is present, even at a distance from the device, in order to continuously monitor its proper functioning;
- **unmanned**: fixed post at which the traffic police operator is not present, even remotely, and automatic operating devices or systems are installed;

30. **MODE OF NOTIFICATION:**
    - **Immediate:** violation immediately notified to the offender, pursuant to Article 200 of the Road Traffic Act; possible for all types of devices.
    - **Deferred:** when the violation is not immediately notified to the offender

31. **DIRECTIONALITY OF MEASUREMENT OF INSTANTANEOUS OR AVERAGE SPEED:**
    - One-way: Measurement of vehicle speed in one direction of travel.
    - Two-way: Measurement of vehicle speed in both directions.

32. **INSTANTANEOUS SPEED MEASUREMENT MODE:**
    - **Distancing:** A device designed to measure speed with the vehicle moving away from the location of the device;
    - **Approach:** Device designed to measure speed with the vehicle approaching the location of the device;
    - **Transverse:** Device designed to measure vehicle speed at the device;
    - **On board a moving vehicle:** when devices are installed in temporary activation mode on board vehicles to measure speed in a dynamic manner, i.e. 'dynamic detection'; for such devices, the presence of police officers is always required when the violation is detected.

33. **MODE OF FILMING**
    - **Front view:** Photo/video recording of the offending vehicle with frontal view.
    - **Rear:** Photographic/video shot of the vehicle in violation with rear view.

34. **SPEED MEASURING RANGE:** Set of speed values that can be measured by a given device under conditions of use defined at the time of type-authorisation of the prototype, i.e. the speed range that the device is capable of measuring, containing at least the range between 30 km/h and 230 km/h.

35. **SPEED LIMIT:** Maximum speed limit imposed where the device is used.

36. **USE LOCATION:** The place of use is where the device is located. If the device is used alternately at several locations with different speed limits, the location where the device is used is considered to be the location with the highest speed limit for initial and periodic calibration and functional checks.

37. **RANGE OF USE:** Subset of the speed measuring range of a device in which it is actually used.
    The lower extreme of this subset is 30 km/h, except for further reductions requested by the user.
    The upper extreme is equal to the value obtained by summing:
    - **a.** Speed limit;
    - **b.** 60 km/h (so as to reach the maximum applicable violation under Article 142 of the Highway Code);
    - **c.** The legal tolerance of 5% of the sum of the addends in the previous points.

    The resulting sum total is rounded up to the nearest 10 km/h.

EVIDENCE

38. **MEASUREMENT UNCERTAINTY:** Parameter associated with the result of a measurement, characterising the dispersion of the value that can be reasonably attributed to the measurand.

39. **CALIBRATION**: set of operations associating to each quantity to be measured, a measurement result (reading) and an associated uncertainty, designed to verify that the measurement error of the device or system complies with the requirements set out in this document, on the basis of which the declaration of conformity is to be made.

40. **CALIBRATION OF THE PROTOTYPE**: Checking the values provided by the calibration of a device prototype, at the type-authorisation stage, against the requirements set out in this document.

41. **INITIAL CALIBRATION:** Checking the values provided by the calibration of each specimen of a device, prior to its first use, against the requirements set out in this document.

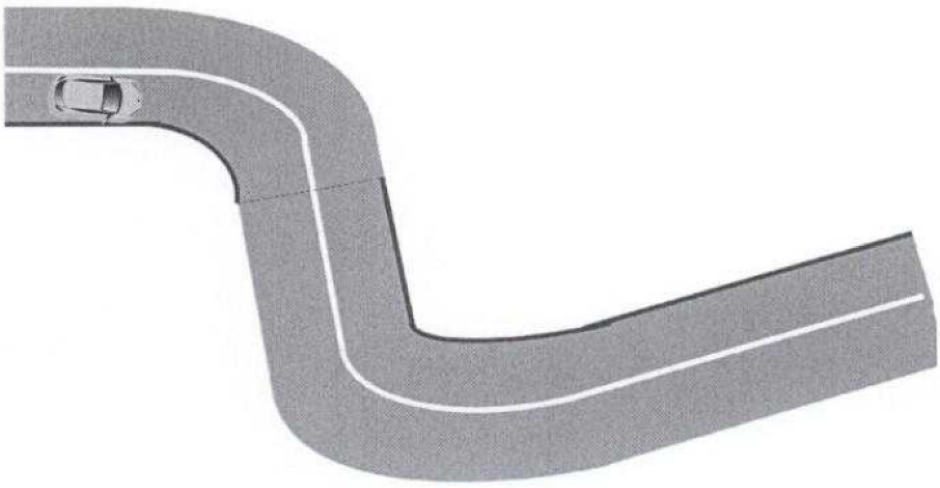
42. **PERIODIC CALIBRATION:** Periodic check of the values provided by the calibration of each device in use against the requirements set out in this document.

43. **CALIBRATION WITH REAL VEHICLE FOR PUNCTUAL SPEED:**
    Calibration mode involving the transit of a real vehicle over the short detection base.
    The speed measured by the system under test is compared with the speed measured by the reference system. The two systems must be completely independent and without any physical or other connection between them.
    It is possible that the passing vehicle itself is equipped with an appropriate reference measurement system.

44. **CALIBRATION BY DIRECT METHOD FOR AVERAGE SPEED:**
    Calibration mode involving the transit of a real vehicle over the extended detection base.

The length of the extended base is subject to calibration in each case, as distinct from the average speed calibration.
This method of verification involves evaluating the error by comparing the speed measured by the system under test with the speed of the reference system. The reference system is calculated by evaluating the transit time of the actual vehicle between the two measuring stations and the length of the extended base.
The two systems must be completely independent and without any physical or other connection between them.
It is possible that the passing vehicle itself is equipped with an appropriate reference measurement system.

45. **EXTENDED BASE LENGTH:** Defined by the minimum geometric development of the road section, counted along the right-hand edge of the rightmost lane when on the right-hand side, and along the left-hand edge of the leftmost lane when on the left-hand side, irrespective of the number of lanes and the direction of travel, provided that they are part of the same carriageway. The extremes of the base must be identified, even by fixed references, and preferably coincide with the axis of the camera field.
    In order to perform this operation, it is therefore necessary not to measure a single continuous line from the beginning to the end of the section but several portions of the section, since between two bends with different directions (e.g. one to the right and the other to the left) it will be necessary to move to the opposite side. This shift operation can be performed at any point where the section is straight between two curves.



46. **TIME LAG:** Difference between the time references (time base/clock) of two average speed measuring devices placed at the entrance and exit of the section under verification. The difference is assessed by measuring the time deviation of each individual local reference against the national UTC (IT) time scale.

47. **CALIBRATION BY INDIRECT METHOD FOR AVERAGE SPEED:** Calibration mode involving the evaluation of the speed indication error through the disjointed evaluation of space and time.

In particular, for the average speed, the error is to be assessed through:

- The calibration of the length of the extended base between the two sensing stations at the input and output of the system under verification;
- The calibration of the time lag between the local time references of the two sensing stations at the input and output of the system under verification;
- The evaluation of other possible sources of uncertainty including the variability of the position or the instant of detection of the vehicle when crossing the extremes of the base.

48. **SPEED SIMULATOR:** An apparatus capable of artificially stressing a device in order to produce the same response, in terms of speed, as when a real vehicle passes on the road.

49. **CALIBRATION WITH SPEED SIMULATOR:** Periodic calibration mode involving the reproduction of the transit of a vehicle by means of a simulator.
    The simulator, the method and the calibration procedure with simulator must be evaluated and accredited by ACCREDIA or other accreditation bodies that are international signatories of mutual recognition agreements, in order to assess and calculate all possible forms of uncertainty.

50. **EXPERIMENTATION**: A period of at least 6 months during which data is collected for functionality checks for the type-authorisation of an average speed detection system.

51. **FUNCTIONALITY CHECKS:** Set of tests to verify the functions of correctly associating the detected speed with the passing vehicle and, as applicable, correctly capturing the images, classifying the vehicles at least into macro-classes, and recognising the number plates of the vehicles detected during type-authorisation. In the initial and periodic phase for average speed, these checks are limited to correctly capturing the images, classifying the vehicles at least in macro-classes, and recognising the number plates of the vehicles detected. In the type-authorisation phase, these tests are carried out by the manufacturer and validated by a third party (universities, police bodies, laboratories, type-authorisation bodies and any other bodies identified by the MIT are allowed), while in the initial and periodic phase they are carried out and recorded by the user police body.

52. **SAFETY CHECKS AT THE PLACE OF USE:** Check carried out at possible and safe speeds on the road section, which may be higher than the speed limit of the road. Checks in excess of the speed limit may only be carried out when traffic is stopped and at speeds indicated by the user. In this case, the transits must be carried out by the user or by a third party authorised by the user.

53. **ACQUIRED VEHICLES:** This means the vehicles actually captured by the device and not those that have passed on the road. The definition is applicable to the acquisition of transit data and vehicle images. For devices not equipped with image documentation, the acquisition is related only to transit data, as indicated in the installation, use and maintenance manual.

CHAPTER 1 - PROTOTYPE AUTHORISATION

PROTOTYPE

1.1 Devices used in the detection of violations of the maximum speed limits are subject to prototype type-authorisation pursuant to § 192(2) of the Regulation. Type-authorisation of the prototype is understood to refer exclusively to the deposited prototype and not to each individual specimen placed on the market in conformity with the prototype. The competence for type-authorisation of speed measuring devices lies with the MIT.

1.2 The prototype is deposited with MIT for type-authorisation in its invariant configuration. In the event that the prototype consists of several identical modules, only one module needs to be filed with MIT. The integrated management software, but not the operator interface software, must be deposited together with the prototype.

1.3 The identification of the prototype is completed by the technical and administrative documentation filed at the same time as the application for type-authorisation and, if necessary, supplemented during the preliminary investigation phase. The technical documentation must necessarily include the manual(s) of the device relating to installation, use and maintenance, the identification of groups 1 and 2 relating to the relevant measurement and non-relevant measurement parts, the documents relating to calibration, functionality checks and testing as defined in this Chapter 1, in addition to any specific and/or sector-specific tests required by the MIT and further documentation spontaneously provided by the applicant for type-authorisation.

1.4 The equipment can be approved as 'instantaneous speed detector devices' or 'average speed detector systems' or both. In the latter case, they will have to meet all the requirements for each type of device.

1.5 The prototype type-authorisation procedure involves calibration and subsequent functionality tests to determine the suitability of the device to perform the required service.

1.6 The deposited prototype is the device on which the calibration and functionality checks are carried out during type-authorisation.

1.7 In the application for type-authorisation, the applicant must fill in the device identification table, which summarises the characteristics and mode of operation of each device. The device identification table will have to be filled in again when applying for an extension of the type-authorisation. Multiple boxes can be ticked for the operation option for devices with multiple functionalities.

1.8 It is the manufacturer's responsibility to ensure that each device placed on the market conforms to the prototype deposited at MIT. Devices placed on the market must comply with the documentation submitted at the time of type-authorisation and subsequent extensions of type-authorisation.

DEVICE IDENTIFICATION TABLE

1	*DEVICE NAME:*	
	MODEL CODE (IF APPLICABLE)	
1	DETAILS OF THE APPROVAL DECREE (FIELD TO BE FILLED IN BY MIT AT THE END OF THE TYPE-AUTHORISATION PROCESS):	
2	AUTHORISATION HOLDER	
3	TYPE OF SPEED DETECTED	☐ INSTANTANEOUS. ☐ MEDIUM.
4	MODE OF OPERATION	☐ MANUAL ☐ AUTOMATIC.
5	TYPE OF LOCATION	☐ MOBILE. ☐ FIXED. ☐ PRESERVED ☐ UNATTENDED.
6	METHODS OF NOTIFICATION	☐ IMMEDIATE ☐ DEFERRED
7	DIRECTIONALITY OF SPEED MEASUREMENT	☐ ONE-WAY ☐ TWO-WAY.
8	INSTANTANEOUS SPEED MEASUREMENT MODE	☐ DISTANCING. ☐ APPROACH ☐ SIMULTANEOUS DISTANCING AND APPROACH. ☐ TRANSVERSAL ☐ ON BOARD MOVING VEHICLE.
9	SHOOTING MODES	☐ FRONT ☐ REAR
10	SPEED MEASURING RANGE	MINIMUM SPEED [km/h]: MAXIMUM SPEED [km/h]:
11	NUMBER OF LANES SURVEYED	
12	SIMULTANEOUS VEHICLE DETECTION	☐ YES. ☐ NO.
13	LIGHTING SYSTEM	☐ VISIBLE ILLUMINATOR ☐ INFRARED ILLUMINATOR ☐ OTHER
14	CLASSIFICATION OF VEHICLES	☐ YES NO. CLASSES SURVEYED: ... ☐ NO.
15	PRESENCE OF OCR	☐ FUNCTIONAL FOR SPEED DETECTION ☐ VERBALISATION SUPPORT
16	OTHER CHARACTERISTICS	**IP RATING** VALUE: **OPERATING TEMPERATURE RANGE AND CLIMATIC CONDITIONS** MINIMUM TEMPERATURE: MAXIMUM TEMPERATURE:

		OTHER:

Table 1: Device identification table listing all its features

1.9 If the same product is available in several models/versions with different boxes ticked in the Product Identification Table, the manufacturer shall complete a separate Product Identification Table for each available model/version.
In this case, the tests required for the type-authorisation of the prototype relating to the characteristic(s) differing between one model/version and the other, will have to be carried out in the different options.

1.10 In the case of filming the front of the infringing vehicle, the manufacturer shall provide evidence of the device's ability to obscure the windscreen automatically, even before the validation phase of the detected violation.

1.11 In the case of photographic evidence produced by the device, these shall contain, in addition to the image of the infringing vehicle, at least the following data:

- Date and time of the violation (in the case of average speed, start and end time of detection);
- Device installation site or section monitored by the system with length measured during calibration of the section;
- Serial number of peripheral units;
- Speed measured in km/h with truncation to the unit by default.

1.12 The device shall only detect as offending vehicles those which, after the application of the speed reduction referred to in Article 345(2) of the Regulation, exceed the speed limit in force on the road.

1.13 In order to ensure authenticity, integrity and non-repudiation, images and data must be encrypted and digitally signed by the device and/or system.

1.14 The storage of images and data must include encryption techniques and passwords.

1.15 The device or system may perform additional functions, as declared by the manufacturer in the filed documentation, which are not subject to approval and therefore cannot be used for the purpose of detecting traffic violations, in compliance with applicable privacy and cybersecurity regulations (e.g. traffic monitoring, statistics, etc.).

1.16 Among the documentation to be produced for prototype type-authorisation, it is necessary to detail:

- The list of parts of the device relevant to the relevant measure - Group 1;
- The list of parts of the device not related to the relevant measure that contribute to the correct acquisition of the violation - Group 2;
- The list of parts of the device not relevant to the relevant measure that do not contribute to the correct acquisition of the violation - Group 3.

1.17 Further device-specific data and information, in addition to those given in the device identification table, must be available in the documentation provided for prototype type-authorisation.

DEVICE MODIFICATIONS

1.18 When changes are made to the device identification table or to the components of an already type-approved device, it is necessary, depending on the case, to proceed with a new type-authorisation or with an extension of the type-authorisation already granted, as specified in the table below.

REQUEST	MODIFICATION OF COMPONENTS	ACTIVITY OR ACTIVITIES
NEW TYPE-AUTHORISATION	PARTS INHERENT IN THE RELEVANT MEASURE (GROUP 1)	The manufacturer must make a new application for type-authorisation of the device. It is possible to use documentation already sent previously.
EXTENSION	PARTS NOT INHERENT IN THE RELEVANT MEASURE THAT CONTRIBUTE TO THE CORRECT ACQUISITION OF THE VIOLATION (GROUP 2)	The manufacturer must establish and produce documentation, tests and analyses relating to the modifications made and forward them to MIT, together with the modified part and the updated device identification table. The MIT has the right to request explanations, further documentation and further testing and analysis of the changes made.
NONE	COMPONENTS NOT INCLUDED IN GROUPS 1 AND 2	The manufacturer does not have to notify the MIT of any replacement, provided that it is made with components that perform as well or better than the replaced component.

Table 2: Activities to be carried out during modifications of device components.

1.19 Each new type-authorisation or extension process produces a new device identification table. The details of the type-authorisation and/or extension decree are entered in the device identification table at the end of the re-authorisation or extension process.

1.20 The documentation to be updated in the case of type-authorisation and extension also includes the list of parts in Groups 1, 2, and 3.

1.21 The device identification table and the list of updated Group 1, 2 and 3 parts must be sent to MIT whenever they change.

CALIBRATION

1.22 Calibration during prototype type-authorisation must be carried out by a LAT with the issue of a calibration certificate.

1.23 Calibration must be carried out by a laboratory whose instrumentation has an expanded uncertainty (with 95% probability of coverage) resulting from the accreditation table of not more than 0.5 km/h for speeds up to 100 km/h and 0.5% for speeds above 100 km/h.

1.24 For instruments or systems measuring average speed, the calibration of the base length shall be carried out by a laboratory whose equipment has an expanded uncertainty (with 95% confidence level) resulting from the accreditation table of not more than 0.3% (percentage value relative to the length of the track). The measurement of the length of the base must be carried out with a calibration certificate issued by an accredited body/laboratory.

1.25 For calibrations involving the passage of a real vehicle, the device or system under test and the reference measurement system shall be positioned so that the measurements are made at a coincident point or area; if this is not possible, the devices shall be positioned so that the measurements are as close together as possible.
The LAT must take into account all significant figures provided or detectable by the device under test.

1.26 The extended calibration uncertainty must be taken into account when assessing the measurement accuracy of the device.

Instantaneous speed

They are defined as follows:

S	$(V_{(UUT)} - V_{REF})$, speed deviation
U_S	Extended uncertainty associated with speed deviation estimation
R	(V_{UUT} / V_{REF}), speed ratio
U_R	Extended uncertainty associated with speed ratio estimation
S_m	Average value of speed deviations
U_{Sm}	Extended uncertainty associated with the estimation of the mean value of speed deviations
R_m	Average value of speed ratios
U_{Rm}	Uncertainty extended to the estimation of the average value of speed ratios
L_S	Maximum limit on individual speed deviation measurement
L_{R1}	Minimum limit on individual speed ratio measurement
L_{R2}	Maximum limit on individual speed ratio measurement
L_{Sm}	Maximum limit on average speed deviation measurements
L_{R1m}	Minimum limit on average speed ratio measurements
L_{R2m}	Maximum limit on average speed ratio measurements

In order to comply with the limits, it must be verified that

	UP TO 100 km/h	OVER 100 km/h

FOR EACH INDIVIDUAL MEASURE	$-L_S + U_S \leq S \leq L_{(S)} - U_S$	$L_{R1} + U_R \leq \mathbf{R} \leq L_{R2} - U_R$
FOR THE AVERAGE OF THE MEASUREMENTS	$-L_{Sm} + U_{Sm} \leq \mathbf{S_m} \leq L_{Sm} - U_{Sm}$	$L_{R1m} + U_{Rm} \leq \mathbf{R_m} \leq L_{R2m} - U_{Rm}$

Average speed

They are defined as follows:

S	$(V_{(UUT)}) - V_{REF})$, speed deviation
U_S	Extended uncertainty associated with speed deviation estimation
$S_{\%}$	$[(V_{UUT} - V_{(REF)}) / V_{REF}]$, relative speed deviation expressed as a percentage
$U_{S\%}$	Extended uncertainty associated with estimation of speed deviation expressed as a percentage
L_S	Maximum limit on individual speed deviation measurement
$L_{S\%}$	Maximum limit on individual speed deviation measurement, expressed as a percentage

In order to comply with the limits set out in this document, it must be verified that

	UP TO 100 km/h	OVER 100 km/h
FOR EACH INDIVIDUAL MEASURE	$-L_S + U_S \leq S \leq L_{(S)} - U_S$	$-L_{S\%} + U_{S\%} \leq \mathbf{S_{\%}} \leq L_{S\%} - U_{S\%}$

1.27 The speed indication provided by the device undergoing calibration during prototype type-authorisation must have an error in relation to the reference measuring system that meets the conditions defined in the table below.

	CALIBRATION DURING PROTOTYPE TYPE-AUTHORISATION	
	UP TO 100 km/h	**OVER 100 km/h**
MAXIMUM PERMISSIBLE ERROR PER MEASUREMENT	3.00 km/h	3.00%
MAXIMUM PERMISSIBLE ERROR PER MEASUREMENT AVERAGE (IF APPLICABLE TO THE ACCREDITED METHOD)	1.0 km/h	1.0%

Table 3: Criterion for assessing calibration error during prototype type-authorisation

In relation to the definitions set out above, the criteria for assessing error result in the following limits.

		CALIBRATION DURING PROTOTYPE TYPE-AUTHORISATION	
		UP TO 100 km/h	**OVER 100 km/h**
INSTANTANEOUS SPEED	FOR EACH INDIVIDUAL MEASURE	$\mathbf{L_S}$ = 3.00 km/h	$\mathbf{L_{R1}}$ = 0.9700 $\mathbf{L_{R2}}$ = 1.0300
	FOR THE AVERAGE OF THE MEASUREMENTS	$\mathbf{L_{Sm}}$ = 1.0 km/h	$\mathbf{L_{R1m}}$ = 0.990 $\mathbf{L_{R2m}}$ = 1.010
AVERAGE SPEED	FOR EACH INDIVIDUAL MEASURE	$\mathbf{L_S}$ = 3.00 km/h	$\mathbf{L_{S\%}}$ = 3.00%

Table 4: Limits of error during prototype type-authorisation

1.28 Depending on the type of speed detected (point 3 of the device identification table) and the other characteristics of the device or system, the conditions for carrying out calibrations are described below.

1. Type of Speed Detected (point 3 of device identification table)

<table>
<tr><td>INSTANTANEOUS</td><td>CALIBRATION:
<table>
<tr><th>N°</th><th>METHOD</th><th>SITE CONSTRAINTS</th><th>RANGE [KM/H]</th><th>PASSAGES PER LANE</th></tr>
<tr><td>1A</td><td>DIRECT SNAPSHOT</td><td>TRACK OR ROAD NOT OPEN TO THE PUBLIC</td><td>30 ÷ 230</td><td>MINIMUM 100, MAXIMUM 200</td></tr>
</table></td></tr>
<tr><td>AVERAGE</td><td>CALIBRATION:
When calibrating the average speed, regardless of the method used, the calibration of the extended base length must be carried out.
For the indirect averaging method (no. 1C), a time lag calibration must be carried out, assessed by measurements taken at intervals of no more than 5 minutes over a period of at least two days.
<table>
<tr><th>N°</th><th>METHOD</th><th>SITE CONSTRAINTS</th><th>RANGE [KM/H]</th><th>PASSAGES</th></tr>
<tr><td>1B</td><td>DIRECT</td><td>TRACK OR ROAD ROUTE LESS THAN OR EQUAL TO THE MINIMUM DECLARED ROUTE</td><td>FROM 30 KM/H TO 230 KM/H</td><td>MINIMUM 100, MAXIMUM 200</td></tr>
<tr><td>1C</td><td>INDIRECT</td><td>TRACK OR ROAD</td><td>30 ÷ 230</td><td>/</td></tr>
</table>
The length of the section to be calibrated may be less than or equal to the declared minimum section length in cases where this option and the characteristics of the equipment allow a simplification of the test site and/or an increase in the maximum speeds achievable on the basis of the method used.</td></tr>
</table>

Table 5: Verification tables (prototype type-authorisation) in relation to the type of speed detected

If even by extending the number of passes or tests up to the maximum allowed, the defined limits are not respected, the prototype type-authorisation is rejected.

2. Directionality of measurement (point 7 of device identification table)

ONE-WAY	**CALIBRATION:** Tests must be carried out for the declared direction of travel.
TWO-WAY	**CALIBRATION:**

	The tests must be carried out for both directions of travel.

3. Instantaneous speed measurement mode (item 8 of device identification table)

DISTANCING	**CALIBRATION:** The evidence must include the mode of distancing.
APPROACH	**CALIBRATION:** The evidence must include the approach mode.
SIMULTANEOUS DISTANCING AND APPROACH	**CALIBRATION:** The tests must include how to approach and leave simultaneously under safe conditions. Evidence must be shared equally between the measurement modes.
TRANSVERSE	**CALIBRATION:** Evidence must include the transversal mode.
ON BOARD MOVING VEHICLE	**CALIBRATION:** The tests must include the moving vehicle mode.

4. Vehicle recovery mode (point 9 of the table device identification)

FRONT	**CALIBRATION:** Evidence of the correct attribution of the measurements made to the vehicles surveyed. Documentary evidence of the darkening of the passenger compartment.
REAR	**CALIBRATION:** *Evidence of the correct attribution of the measurements made to the vehicles surveyed*.

5. Speed measuring range (item 10 of device identification table)

CALIBRATION: Speeds must be evenly distributed in intervals of no more than 20 km/h.

6. Number of lanes surveyed (item 11 of device identification table)

CALIBRATION: Evidence of operation on the maximum number of lanes controlled by the device.

7. Classification of vehicles (Point 14 of the device identification table)

CLASSES OF VEHICLES SURVEYED	**FUNCTIONALITY CHECKS:** Evidence of performance as defined in the installation, operation and maintenance manual. Classification into one or more groups according to the following table pursuant to Art. 142(3) of the Code. Vehicles from the undetected groups are to be merged into a single 'undefined' group.

	Gruppo
Motoveicoli	A
Autoveicoli fino a 3,5 t	
Autoveicoli trasporto merci da 3,5 a 12 t	B
Autobus oltre 8 t	
Autobus fino a 8 t	C
Autoveicoli trasporto merci oltre 12 t	C
Autotreni	
Autoarticolati	
Autosnodati	
Quadricicli	D
Ciclomotori	E

Motoveicoli	*Motorbikes*
Autoveicoli fino a 3,5 t	*Vehicles up to 3.5 t*
Autoveicoli trasporto merci da 3,5 a 12 t	*Goods transport vehicles from 3.5 to 12 t*
Autobus oltre 8 t	*Buses over 8 t*
Autobus fino a 8 t	*Buses up to 8 t*
Autoveicoli trasporto merci oltre 12 t	*Goods road transport vehicles over 12 t*
Autotreni	*Lorries*
Autoarticolati	*Tractor-trailers*
Autosnodati	*Articulated lorries*
Quadricicli	*Quadricycles*
Ciclomotori	*Mopeds*
Gruppo	*Group*
A	*A*
B	*B*
C	*C*
D	*D*
E	*E*

Table 6: Vehicle groups for classification purposes.

8. Presence of OCR (item 15 of device identification table)

FUNCTIONAL FOR SPEED DETECTION	Performing the tests required by the UNI 10772 technical standard. (see section on laboratory tests)
VERBALISATION SUPPORT	No proof is required.

1.29 For devices or systems that detect average speed, the manufacturer shall specify the minimum distance over which he can guarantee compliance with the error limits given in Table 4 in the speed range between 30 km/h and 230 km/h. The calibration of the prototype, irrespective of the method used, must be carried out on a route with a length less than or equal to the minimum route declared by the manufacturer.
In the case of calibration by the direct method, the distance must be calibrated; however, in the case of calibration by the indirect method, it may be set arbitrarily to a value less than or equal to the minimum distance specified by the manufacturer, whatever the actual installation position of the two measuring points; in this case, a calibration uncertainty of 0.3 % of the distance must be taken into account when calibrating the average speed.
Regardless of the minimum route declared by the manufacturer, the system may not be installed on a route of less than 500 metres, as per Interministerial Decree no. 105 of 2024.
During type-authorisation, the manufacturer must declare the vehicle detection area of the individual device.

FUNCTIONALITY CHECKS

1.30 Functionality tests have the objective of assessing the functioning of the device under different conditions of use through experimentation carried out by the manufacturer under the supervision of a third party.
Part of the functionality tests and experiments include transits during all times of the day, including dawn, midday, dusk, night, depending on the characteristics of the device. The data must come from tests on different days and be related to different weather conditions: clear, sunny, overcast, rainy days, compatible with the characteristics of the device. Samples must be extracted from the data collected to cover all the cases described. Other indications of specific functionality and testing are defined in relation to the type and characteristics of the device.

1.31 Upon completion of the functional tests, the manufacturer shall prepare a technical report containing information highlighting the results of the tests, including detection, identification, classification and attribution of measurements to the vehicle, if applicable, in relation to the characteristics and functionality of the device. The manufacturer may supplement the functionality test report with other useful data and information.

If necessary, or in order to shorten the typical use session, in order to make the duration of the verification session reasonable, it is permissible to reduce the speed limit set on the device that discriminates vehicle detection, in accordance with the

mode and limits of image and data acquisition of the device, as indicated in the installation, use and maintenance manual of the device or system. Evidence of the operational limits of the devices are not to be understood as malfunctions.

1.32 Some functionality verification activities can be performed remotely, if provided for in the installation, operation and maintenance manual of the device or system.

1.33 The functionality check also includes the following activities:

- Verification that all components of the device or system are functional; these verifications must be carried out according to the methods and with the tools indicated in the installation, use and maintenance manual for the device or system;
- Verification of the integrity of the device or system;
- Verification of any seals present;
- Self-diagnosis using the tools defined in the installation, operation and maintenance manual of the device or system, when present;
- Any further checks required in the installation manual, use and maintenance of the device or system.

The manufacturer has the right to integrate the information gathered and the verification activities carried out during the functional check, also following the instructions in the installation, use and maintenance manual of the specific equipment or system.

1.34 The device only passes the functionality check if each individual check is successful.

1.35 Functionality checks do not replace the calibration carried out by the LAT and the maintenance and/or overhaul checks defined by the manufacturer in the installation, use and maintenance manual of the device or system. Maintenance and/or overhaul checks must be carried out in accordance with the schedule and as defined in the installation, use and maintenance manual.

1.36 The possibility of using the findings of the functionality checks for the application of sanctions for breaches of rules of conduct is in any case excluded.

1.37 In relation to the type of speed detected (point 3 of the device identification table), the conditions for carrying out functionality and testing are described below.

1. ***Type of Speed Detected (point 3 of device identification table)***

INSTANTANEOUS	**FUNCTIONALITY CHECKS:** The total number of transits must be at least 10,000 for automatically operated devices or systems and 5,000 for manually operated devices or systems. All transits must be verified individually. The minimum duration of the detection session must be at least 24 hours in total for automatically operating devices or systems with different lighting conditions. In the case of manually operated devices or systems, 12 one-hour sessions with different lighting conditions must be carried out. The minimum number of buses to be recorded is 50, the minimum number of lorries, articulated and articulated vehicles is 250, and the minimum number of motorbikes and mopeds is 100. By setting the maximum permitted speed limit to a value close to 0 on the device, the trial is considered successful if the device is able to detect at least 90 per cent of the passing vehicles: • correctly attribute the speed of at least 95 % of the vehicles detected; • Correctly capture the image and/or video (if any) of at least 95 per cent of the vehicles detected; • Correctly classify at least 90 % of the detected vehicles according to the classes defined in point 14 of the device identification table (if classification is provided); • read and correctly attribute the number plates of 95% of the vehicles detected (if applicable). If it is not possible to detect passing vehicles in compliance with the minimum limit of 90 per cent due to objective impossibility (e.g. obstruction of the measuring field), the manufacturer must submit an appropriate deviation report.
AVERAGE	**EXPERIMENTATION:** The data collection associated with the test campaign will involve a total of 1 million transits or a total period of at least 6 months, divided between the two start and stop stations (hereafter also referred to as start and stop), with random vehicle transit on all lanes. Of these transits, a sample, having the numbers and characteristics described in the following points, will have to be verified transit by transit by an experienced operator with the production of an appropriate test report, while all other transits will only be recorded and archived. All data collected, including data that has not been verified by the operator, will subsequently be exported to appropriate storage media and handed over to the Ministry to enable independent verification. FIRST SINGLE STATION TEST, BOTH START AND STOP: The peripheral system must be configured to record and historise data and photos of each individual vehicle in transit. The system must not be able to access external databases to supplement any missing information (e.g: MCTC). The experiment will be carried out on a specific pair of posts installed on a road or motorway carriageway. Using a CCTV camera (or similar) completely independent of the infringement detection system, the number of vehicles correctly detected and photographed by the control post shall be checked against the total number of vehicles counted by analysing the video recording, which shall be a total of

	10 hours, 5 for each control post, with a minimum of one hour of uninterrupted footage, different between start and stop, and thus divided according to environmental conditions: o 1 hour at night; o 1 hour in daytime; o 1 hour at dawn; o 1 hour at sunset; o 1 hour with rain and/or fog. The system is considered suitable if, for each of the two sensing stations, input and output, it is able to correctly acquire images for more than 95 per cent of the total number of detections processed in each session. SECOND SINGLE POSITION TEST, BOTH START AND STOP: the class indicated by the peripheral system for each vehicle must be compared with what can be detected by the frame taken by the cameras, with a minimum of 50,000 total vehicles, drawn randomly from the total number of transits, for each of the two portals. In order to assess the device's ability to classify vehicles correctly, it must be shown that at least 5 per cent of the total number of transits analysed belong to the heavy vehicle category. Specifically, this number being 50,000 vehicles, at least 2,500 must be heavy vehicles, of which at least 500 must be buses and 2,000 must be lorries, tractor-trailers and semi-trailers, and at least 250 motorbikes. The system must classify the vehicles into a minimum number of classes that can be traced back to the vehicle categories to which the speed limits currently stipulated in Art. 142, c. 3 of the Highway Code apply, it being understood that an indication must be given of the vehicle classes that the system was unable to recognise. The classification test is considered successful if, both for each class and out of the total number analysed, the number of correctly classified vehicles is more than 90 per cent. THIRD SINGLE PLATE TEST, BOTH START AND STOP: comparison between the licence plate read by the OCR, if present, and the licence plate visible in the photo taken by the cameras, using the same analysis sample as in the classification test. The system is considered suitable if, for each of the two detection locations, inbound and outbound, it is able to correctly recognise the number plate for more than or at least 95 per cent of the vehicles passed. FOURTH TEST PAIR OF POSTS: The test shall be carried out on a specific pair of stations installed on a road or motorway section with a carriageway consisting of at least 2 lanes + emergency lane (the latter, if any, shall be monitored in the same way as the other lanes) and "hermetic", i.e. without any entrances/exits or single points such as service areas/parking areas, so that the coupling of all transits can be verified. It is suggested that the pair of posts be configured with a speed limit close to zero (e.g. average speed limit of 5 km/h on the motorway), so that almost all vehicles passing through the section under consideration are considered to be in presumed violation. The test will involve a minimum of 5,000 total vehicles, randomly drawn from

	the total number of transits, in a data collection in multiple sessions of suitable duration to collect at least 500 alleged violations each, with each of the following environmental conditions: o at night; o in daytime; o at dawn; o at sunset; o with rain and/or fog. For each vehicle coupling test campaign, it is suggested to start the normal operation of the stop station after a reasonable time after the start of the normal operation of the start station, in order to ensure that all vehicles within the route have already been detected by the start station, and thus the vehicle coupling test can be meaningful. In this way, the system is theoretically able to match all vehicles in transit to the stop portal from the moment it starts. In addition, it is suggested that video footage be taken by means of a video surveillance camera (or similar) that is completely independent of the violation detection system, to allow for better verification by the operator. For all transits coupled by the system, a comparison must be made between the frame collected by the start station and the one collected by the stop station, to verify that the system has coupled the same vehicle and that no malfunctions occur. A system is considered adequate if it is capable of correctly coupling the images of vehicles passing under the two stations for more than 95 per cent of those taken in the single session and of the total number passed; correct coupling means that the same vehicle must be represented in the image pair. To be successful, all transits must be correctly detected by the device and photographed within the declared area. For all transits not paired by the system, subdivision of each image, also with the help of the analysis of the video recording made at the above-mentioned location, into • missed detections at the stop portal (evidenced by the analysis of the video surveillance footage); • missed couplings (transits detected at the stop but not coupled by the system); • transits that cannot be physiologically coupled (e.g. transits of vehicles without number plates, transits detected twice by the stop detection station, …).

Table 7: Verification tables (prototype type-authorisation) in relation to the type of speed detected

If even by extending the number of passes or tests up to the maximum allowed, the defined limits are not respected, the prototype type-authorisation is rejected.

2. Directionality of measurement (point 7 of device identification table)

ONE-WAY	**FUNCTIONALITY CHECKS:**

	Tests must be carried out for the declared direction of travel.
TWO-WAY	**FUNCTIONALITY CHECKS:** The tests must be carried out for both directions of travel.

3. Vehicle recovery mode (point 9 of the table device identification)

FRONT	**FUNCTIONALITY CHECKS:** Evidence of the correct attribution of the measurements made to the vehicles surveyed. Documentary evidence of the darkening of the passenger compartment.
REAR	**FUNCTIONALITY CHECKS:** *Evidence of the correct attribution of the measurements made to the vehicles surveyed*.

4. Simultaneous detection of vehicles (item 12 of device identification table)

FUNCTIONALITY CHECKS: Evidence of operation in cases of simultaneous passage in both same- and opposite-direction lanes.

5. Classification of vehicles (Point 14 of the device identification table)

CLASSES OF VEHICLES SURVEYED	**FUNCTIONALITY CHECKS:** Evidence of performance as defined in the installation, operation and maintenance manual. Classification, as far as possible, into one or more groups according to the following table, pursuant to Art. 142(1) and (3) of the Code. Vehicles from the undetected groups are to be merged into a single 'undefined' group.

	Gruppo
Motoveicoli	A
Autoveicoli fino a 3,5 t	
Autoveicoli trasporto merci da 3,5 a 12 t	B
Autobus oltre 8 t	
Autobus fino a 8 t	C
Autoveicoli trasporto merci oltre 12 t	C
Autotreni	
Autoarticolati	
Autosnodati	
Quadricicli	D
Ciclomotori	E

Motoveicoli	*Motorbikes*
Autoveicoli fino a 3,5 t	*Vehicles up to 3.5 t*
Autoveicoli trasporto merci da 3,5 a 12 t	*Goods transport vehicles from 3.5 to 12 t*
Autobus oltre 8 t	*Buses over 8 t*
Autobus fino a 8 t	*Buses up to 8 t*
Autoveicoli trasporto merci oltre 12 t	*Goods road transport vehicles over 12 t*
Autotreni	*Lorries*
Autoarticolati	*Tractor-trailers*
Autosnodati	*Articulated lorries*
Quadricicli	*Quadricycles*
Ciclomotori	*Mopeds*
Gruppo	*Group*
A	*A*
B	*B*
C	*C*
D	*D*
E	*E*

Table 8: Vehicle groups for classification purposes.

6. Other features (item 16 of device identification table)

The manufacturer identifies among the tests required below those relevant to its own type of device and integrates any additional ones dependent on its specific technology.

TEMPERATURE RANGE OF USE	Documentary evidence of the analyses, tests and trials carried out (see section on laboratory tests).
IP RATING	Documentary evidence of the analyses, tests and trials carried out (see section on laboratory tests).

LABORATORY TESTS

In addition to the above tests, the following laboratory tests must also be carried out on the device prototype:

- function test of the device under particular climatic conditions, according to the following standards:
  - EN 60068-2-1 - Test A: Cold;
  - EN 60068-2-2 - Test B: Dry heat;
  - EN 60068-2-30 - Test Db: Damp heat, cyclic (12 h + 12 h cycle) - Damp heat, cyclic (12 h + 12 h cycle);
  - EN 60068-2-14 - Test No: Change of temperature;
  - EN 60068-2-78 - Test Cab: Damp heat, steady state.

  These tests will also have to demonstrate that the entire device is capable of operating in a declared temperature range;
- IP protection test according to technical standard EN 60529. The IP rating of the entire device must be at least IP66 for devices in unmanned stations;
- If laser sensors are present, the laser source classification test according to the technical standard EN 60825-1 must also be performed.
  The laser must be class 1;
- if illuminators are present, it is also necessary to perform the photobiological safety test according to the technical standard EN 62471.
  The light source must belong to risk group '1' at the most;
- If radar sensors are present, the documentation must be accompanied by EU Declarations of Conformity, produced by the manufacturers, to Directives 2014/53/EU (Radio Equipment - RED), 2014/30/EU (Electromagnetic Compatibility - EMC) and 2014/35/EU (Low Voltage - LVD), where relevant.
- if the automatic number plate reading (OCR) capability is to be recognised within the scope of type-authorisation, the device or system must be tested in accordance with UNI 10772 for rear number plates of motor vehicles and number plates of mopeds and motorbikes, up to the upper limit of the speed range. If the device also detects the speed when approaching with the frontal shot of the infringing vehicle, the

extended test according to the above-mentioned standard for front plates up to the upper limit of the speed range must also be carried out. For both front and rear licence plates of motor vehicles, if the device or system is capable of monitoring two or more lanes, tests according to UNI 10772 must also be conducted in non-channelled traffic mode.

The tests described in this paragraph must be carried out, with the issue of a specific test report, by testing laboratories accredited to UNI CEI EN ISO/IEC 17025 for the specific tests provided for in the relative technical reference standards listed above, by ACCREDIA or by other accreditation bodies that are signatories to international mutual recognition agreements.

CHAPTER 2 - CALIBRATION AND INITIAL AND PERIODIC FUNCTIONAL CHECKS

CALIBRATION

2.1 Initial and periodic calibrations must be carried out to ensure that the device meets the speed measurement requirements and maintains the performance required in this Chapter 2, throughout the useful life of the device.

2.2 Each unit must undergo initial calibration before being put into operation.
Within one year after the initial calibration has been carried out and at least annually thereafter, periodic calibration must be carried out on each device in use.
If the annual periodic calibration deadline is not met, the device must be taken out of service; before being put back into service, the device must undergo periodic calibration. If the latter is not carried out within three years of the last calibration, a new initial calibration must be carried out before the device is put back into service.
For fixed installations, a new initial calibration needs to be performed if the infrastructure characteristics of the new location are changed.

2.3 Initial and periodic calibrations must be carried out for each of the device's functionalities used by the user. Devices used for both instantaneous and average speed require tests for both types of speed.

2.4 Initial and periodic calibrations must be performed by a LAT and a calibration certificate issued.

2.5 Calibrations must be carried out by a laboratory whose expanded uncertainty resulting from the accreditation table is no greater than 0.5 km/h for speeds up to 100 km/h and 0.5% for speeds above 100 km/h.

2.6 For systems measuring average speed, the calibration of the base length must be carried out by a laboratory whose expanded uncertainty resulting from the accreditation table does not exceed 0.3% (percentage value relative to the length of the route). The measurement of the length of the base must be carried out with the issue of a calibration certificate.
The calibration of the base length does not expire and only needs to be repeated in the event of changes to the geometric development of the section, including a change in the number of lanes.

2.7 For the direct method, the device under test and the reference measuring system must be positioned so that measurements are taken at a coincident point or area; if this is

not possible, the devices must be positioned so that the measurements are as close together as possible.
The LAT must take into account all significant figures provided or detectable by the device under test.

2.8 The extended calibration uncertainty must be taken into account when assessing the accuracy of the device.

Instantaneous speed

They are defined as follows:

S	$(V_{(UUT)} - V_{REF})$, speed deviation
U_S	Extended uncertainty associated with speed deviation estimation
R	(V_{UUT} / V_{REF}), speed ratio
U_R	Extended uncertainty associated with speed ratio estimation
S_m	Average value of speed deviations
U_{Sm}	Extended uncertainty associated with the estimation of the mean value of speed deviations
R_m	Average value of speed ratios
U_{Rm}	Uncertainty extended to the estimation of the average value of speed ratios
L_S	Maximum limit on individual speed deviation measurement
L_{R1}	Minimum limit on individual speed ratio measurement
L_{R2}	Maximum limit on individual speed ratio measurement
L_{Sm}	Maximum limit on average speed deviation measurements
L_{R1m}	Minimum limit on average speed ratio measurements
L_{R2m}	Maximum limit on average speed ratio measurements

In order to comply with the limits, it must be verified that

	UP TO 100 km/h	OVER 100 km/h
FOR EACH INDIVIDUAL MEASURE	$-L_S + U_S \leq S \leq L_{(S)} - U_S$	$L_{R1} + U_R \leq \mathbf{R} \leq L_{R2} - U_R$
FOR THE AVERAGE OF THE MEASUREMENTS	$-L_{Sm} + U_{Sm} \leq \mathbf{S_m} \leq L_{Sm} - U_{Sm}$	$L_{R1m} + U_{Rm} \leq \mathbf{R_m} \leq L_{R2m} - U_{Rm}$

Average speed

They are defined as follows:

S	$(V_{(UUT)} - V_{REF})$, speed deviation
U_S	Extended uncertainty associated with speed deviation estimation
$S_{\%}$	$[(V_{UUT} - V_{(REF)}) / V_{REF}]$, relative speed deviation expressed as a percentage
$U_{S\%}$	Extended uncertainty associated with estimation of speed deviation expressed as a percentage
L_S	Maximum limit on individual speed deviation measurement
$L_{S\%}$	Maximum limit on individual speed deviation measurement, expressed as a percentage

In order to comply with the limits set out in this document, it must be verified that

	UP TO 100 km/h	OVER 100 km/h
FOR EACH INDIVIDUAL MEASURE	$-L_S + U_S \leq S \leq L_{(S)} - U_S$	$-L_{S\%} + U_{S\%} \leq \mathbf{S_{\%}} \leq L_{S\%} - U_{S\%}$

2.9 The speed indication provided by the device undergoing the initial and periodic calibration test must have an error relative to the reference measuring system that meets the conditions defined in the table below.

	INITIAL CALIBRATION		PERIODIC CALIBRATION	
	UP TO 100 km/h	**OVER 100 km/h**	**UP TO 100 km/h**	**OVER 100 km/h**
MAXIMUM PERMISSIBLE ERROR PER MEASUREMENT	3.00 km/h	3.00 %	4.00 km/h	4.00 %
MAXIMUM PERMISSIBLE ERROR PER MEASUREMENT AVERAGE (IF APPLICABLE TO THE ACCREDITED METHOD)	1.0 km/h	1.0%	1.5 km/h	1.5%

Table 9: Initial and periodic calibration error evaluation criteria

In relation to the definitions set out above, the criteria for assessing error result in the following limits.

		CALIBRATION INITIAL		PERIODIC CALIBRATION	
		UP TO 100 km/h	**OVER 100 km/h**	**UP TO 100 km/h**	**OVER 100 km/h**
INSTANTANEOUS SPEED	FOR EACH INDIVIDUAL MEASURE	L_S = 3.00 km/h	L_{R1} = 0.970. L_{R2} = 1.030.	L_S = 4.00 km/h	L_{R1} = 0.960 L_{R2} = 1.040
	FOR THE AVERAGE OF THE MEASUREMENTS	L_{Sm} = 1.0 km/h	L_{R1m} = 0.990 L_{R2m} = 1.010	L_{Sm} = 1.5 km/h	L_{R1m} = 0.985 L_{R2m} = 1.015
AVERAGE SPEED	FOR EACH INDIVIDUAL MEASURE	L_S = 3.00 km/h	$L_{S\%}$ = 3.00%	L_S = 4.00 km/h	$L_{S\%}$ = 4,00%

Table 10: Initial and periodic calibration test error limits

2.10 Depending on the type of speed detected (point 3 of the device identification table) and the other characteristics of the device or system, the conditions for carrying out calibrations are described below.

1. ***Type of Speed Detected (point 3 of device identification table)***

INSTANTANEOUS	**INITIAL CALIBRATION:** For devices placed at fixed locations, for which it is not possible to evaluate the entire measuring range at the place of use, two different tests are foreseen during initial calibration:

- The first test verifies the device over the entire measuring range on a track or road not open to the public This test can be carried out by the manufacturer;
- The second test verifies the functioning of the device once it has been deployed over a reduced range of use with an upper limit equal to the maximum speed limit of the specific road.

A maximum time of two years is allowed between the first and second test; the calibration date to be considered for the definition of the periodicity of the tests will be the date of the second test. The second test must have been carried out before commissioning.

N°	METHOD		SITE CONSTRAINTS	RANGE [km/h]	PASSAGES PER LANE
2A	**DIRECT SNAPSHOT** (EXCLUDING DEVICES IN FIXED LOCATIONS)		TRACK, OR ROAD NOT OPEN TO THE PUBLIC, OR PLACE OF USE	30 ÷ MEASURING RANGE	MINIMUM 100 MAXIMUM 200
2B	**DIRECT SNAPSHOT**	FIRST TEST	TRACK OR ROAD NOT OPEN TO THE PUBLIC	30 ÷ MEASURING RANGE	MINIMUM 100 MAXIMUM 200
		SECOND TEST	SITE OF OPERATION	SPEEDS SAFELY POSSIBLE AT THE PLACE OF USE	MINIMUM 100 MAXIMUM 200

PERIODIC CALIBRATION:

N°	METHOD	SITE CONSTRAINTS	RANGE [km/h]	PASSAGES
3A	**DIRECT SNAPSHOT** (EXCLUDING DEVICES IN FIXED LOCATIONS)	TRACK OR ROAD NOT OPEN TO THE PUBLIC OR PLACE OF USE	30 ÷ MEASURING RANGE	MINIMUM 50 MAXIMUM 100
3B	**DIRECT SNAPSHOT** (EXCLUDING DEVICES IN FIXED LOCATIONS)	SITE OF OPERATION	30 ÷ SPEEDS SAFELY POSSIBLE AT THE PLACE OF USE	MINIMUM 50 MAXIMUM 100
3C	**SIMULATION** (COMPLEMENTARY TO THE TESTS IN 3B, FOR DEVICES WHOSE TECHNOLOGY ALLOWS IT)	N. A.	SPEEDS NOT SAFELY ATTAINABLE ÷ MEASURING RANGE	FOR EACH SIMULATED SPEED MINIMUM 50 MAXIMUM 100

The modes to be tested are all those provided for in the device identification

<table>
<tr><td></td><td>table. It is possible, at the option of the user, to test a subset of it; in that case, the specimen may be used in the modes tested for it only.</td></tr>
<tr><td>AVERAGE</td><td>
INITIAL CALIBRATION:
When calibrating the average speed, regardless of the method used, the calibration of the extended base length must be carried out.
For calibration with the indirect method for the average speed (point 2D in the following table), a time lag calibration must be carried out, assessed by measurements taken at intervals of no more than 5 minutes over a period of at least two days.
<table>
<tr><th>N°</th><th>METHOD</th><th>SITE CONSTRAINTS</th><th>RANGE [KM/H]</th><th>PASSAGES</th></tr>
<tr><td>2C</td><td>DIRECT MEDIUM</td><td>SITE OF OPERATION</td><td>SPEEDS SAFELY POSSIBLE AT THE PLACE OF USE</td><td>MINIMUM 100
MAXIMUM 200</td></tr>
<tr><td>2D</td><td>INDIRECT MEDIUM</td><td>SITE OF OPERATION</td><td>30 ÷ RANGE OF USE</td><td>/</td></tr>
</table>
PERIODIC CALIBRATION:
When calibrating the average speed, regardless of the method used, it is necessary to calibrate the length of the extended base if the geometry of the section is changed.
For the indirect mean (3D) method, a time lag calibration must be carried out, assessed by measurements taken at intervals of no more than 5 minutes over a period of at least two days.
<table>
<tr><th>N°</th><th>METHOD</th><th>SITE CONSTRAINTS</th><th>RANGE [km/h]</th><th>PASSAGES</th></tr>
<tr><td>3C</td><td>DIRECT MEDIUM</td><td>SITE OF OPERATION</td><td>SPEEDS SAFELY POSSIBLE AT THE PLACE OF USE</td><td>MINIMUM 100
MAXIMUM 200</td></tr>
<tr><td>3D</td><td>INDIRECT MEDIUM</td><td>SITE OF OPERATION</td><td>30 ÷ RANGE OF USE</td><td>/</td></tr>
</table>
</td></tr>
</table>

Table 11: Description of initial and periodic calibrations

If, even by extending the number of tests up to the maximum allowed, the defined limits are not met, the device is unsuitable for use.

2. Directionality of measurement (point 7 of device identification table)

ONE-WAY	**INITIAL AND PERIODIC CALIBRATION:** Tests must be carried out for the direction of travel used.
TWO-WAY	**INITIAL AND PERIODIC CALIBRATION:** The tests must be carried out for both directions of travel.

3. ***Instantaneous speed measurement mode (item 8 of device identification table)***

DISTANCING	**INITIAL AND PERIODIC CALIBRATION:** The evidence must include the mode of distancing.
APPROACH	**INITIAL AND PERIODIC CALIBRATION:** The evidence must include the approach mode.
SIMULTANEOUS DISTANCING AND APPROACH	**INITIAL AND PERIODIC CALIBRATION:** The tests must include how to approach and leave simultaneously under safe conditions. Evidence must be shared equally between the measurement modes.
TRANSVERSE	**INITIAL AND PERIODIC CALIBRATION:** Evidence must include the transversal mode.

4. Speed measuring range (item 10 of device identification table)

INITIAL AND PERIODIC CALIBRATION: Speeds must be evenly distributed in intervals of no more than 20 km/h.

5. Number of lanes surveyed (item 11 of device identification table)

INITIAL AND PERIODIC CALIBRATION: On-site calibration tests must be distributed over all lanes controlled by the device.

FUNCTIONALITY CHECKS

2.11 The functionality check is performed to ensure that the device shows no evidence of malfunctioning and is reported by the user after the initial or periodic calibration of the device, prior to the first use of the device.

2.12 With regard to the characteristics and modes of operation of the instrument summarised in the instrument identification table, an initial verification and subsequent periodic verifications shall be carried out for each instrument in service, comprising specific tests and analyses for each characteristic and/or requirement possessed, in accordance with the table of initial and periodic tests relating to the characteristics of the instrument.

2.13 When using a subset of the following options per individual specimen, it is sufficient to carry out the initial and periodic verification only for the options used: (point 3) type of measured speed instantaneous or average; (point 7) directionality of speed measurement one-way or two-way; (point 8) mode of measurement of instantaneous speed moving away, approaching, transversal or on board vehicle; (point 11) number of lanes measured.
Should the user wish to expand the subset of use of the individual device, a new initial calibration test must be carried out which includes all options considered.

2.14 When the field of use is extended or the location of the individual device is changed, if the characteristics of the road infrastructure change, a new initial calibration test of the device must be carried out. In the event that the initial calibration test is carried out in two tests (case 2B of the table of initial and periodic tests in relation to device characteristics), only the second test must be carried out when the place of use is changed.

2.15 Some functionality verification activities can be performed remotely, if provided for in the installation, operation and maintenance manual of the device or system.

2.16 The functionality check also includes the following activities:

- Verification that all components of the device or system are functional; these verifications must be carried out according to the methods and with the tools indicated in the installation, use and maintenance manual for the device or system;
- Verification of the integrity of the device or system;
- Verification of any seals present;
- Self-diagnosis using the tools defined in the installation, operation and maintenance manual of the device or system, when present;
- Any further checks required in the installation manual, use and maintenance of the device or system.

The user has the option of integrating the information gathered and the verification activities performed during the functionality check, also following the instructions in the installation, use and maintenance manual of the specific device or system.

2.17 The initial and periodic functional checks are documented by means of a report, drawn up by the user pursuant to Art. 2700 of the Civil Code.

The functional verification report includes at least the following information:

- Type of verification, whether initial or periodic;
- Device data: name, device serial number, details of type-authorisation decree, details of calibration certificate;
- Verification and verifier data: date of verification report, place of verification, name of verifier(s);
- Survey data: day, start and end time, acquisition data.

For each activity that is the subject of the device's functional verification, a positive result must be recorded in the report.

2.18 The device only passes the functionality check if each individual check is successful.

2.19 Functionality checks do not replace the calibration carried out by the LAT and the maintenance and/or overhaul checks defined by the manufacturer in the installation, use and maintenance manual of the device or system. Maintenance and/or overhaul checks must be carried out in accordance with the schedule and as defined in the installation, use and maintenance manual.

2.20 The possibility of using the findings of the functionality checks for the application of sanctions for breaches of rules of conduct is in any case excluded.

2.21 In relation to the type of speed detected (point 3 of the device identification table), the conditions for carrying out functionality checks are described below.

1. ***Type of Speed Detected (point 3 of device identification table)***

INSTANTANEOUS	**FUNCTIONALITY CHECKS AT AN EARLY STAGE:** The total number of transits must be at least 500 for automatically operated devices or systems and 250 for manually operated devices or systems. All transits forming part of the verification must be verified individually. The minimum duration of the detection session must be at least 24 hours for devices or systems with automatic operation. In the case of manually operated devices or systems, 12 one-hour sessions with different lighting conditions must be carried out. The minimum number of buses to be surveyed is 5, that of lorries, articulated and articulated vehicles is 25, that of motorbikes and mopeds is 10 By setting the maximum permitted speed limit to a value close to 0 on the device, the trial is considered successful if the device is able to detect at least 90 per cent of the passing vehicles: • correctly attribute the speed of at least 95 % of the vehicles detected; • Correctly capture the image and/or video (if any) of at least 95 per cent of the vehicles detected;

	• Correctly classify at least 90 % of the detected vehicles according to the classes defined in point 14 of the device identification table (if classification is provided); • read and correctly attribute the number plates of 95% of the vehicles detected (if applicable). **FUNCTIONALITY CHECKS ON A PERIODIC BASIS:** The total number of transits must be at least 200 for automatically operated devices or systems and 100 for manually operated devices or systems. All transits forming part of the verification must be verified individually. A minimum number of: - 1 bus - 5 trucks, tractor-trailers, articulated and articulated lorries - 2 between motorbikes and mopeds By setting the maximum permitted speed limit to a value close to 0 on the device, the trial is considered successful if the device is able to detect at least 90 per cent of the passing vehicles: • correctly attribute the speed of at least 95 % of the vehicles detected; • Correctly capture the image and/or video (if any) of at least 95 per cent of the vehicles detected; • Correctly classify at least 90 % of the detected vehicles according to the classes defined in point 14 of the device identification table (if classification is provided); • read and correctly attribute the number plates of 95% of the vehicles detected (if applicable).
AVERAGE	**FUNCTIONALITY CHECKS AT AN EARLY STAGE:** The data collection in connection with the test campaign will involve a total of at least 5,000 transits in total or over a period of at least one month, under different lighting and environmental conditions, divided between the two start and stop stations (hereafter also referred to as start and stop), with random vehicle transits in all lanes. Of these transits, a sample, having the numbers and characteristics described in the following points, will have to be verified transit by transit by an experienced operator with the production of an appropriate test report, while all other transits will only be recorded and archived. FIRST SINGLE STATION TEST, BOTH START AND STOP: The peripheral system must be configured to record and historise data and photos of each individual vehicle in transit. The system must not be able to access external databases to supplement any missing information (e.g: MCTC). The verification will be carried out on a specific pair of posts installed on a road or motorway carriageway. The number of vehicles correctly detected and photographed by the control post shall be checked against the total number of vehicles counted by analysing the video recording, possibly using a CCTV camera (or similar), even independently of the infringement detection system, for a total of 10 hours of filming, 5 for each control post, in shots of at least one hour each, without interruptions, different between start and stop.

	The system is considered to be suitable if, for each of the two detection locations, input and output, it is able to correctly acquire images for a number of detections greater than or at least equal to 95 per cent of the total processed in each session. SECOND INDIVIDUAL TEST, BOTH START AND STOP: the class indicated by the peripheral system for each vehicle must be compared with what can be detected by the frame taken by the cameras, with a minimum of 500 total vehicles, drawn randomly from the total number of transits, for each of the two portals. In order to assess the device's ability to correctly classify vehicles at the installation site, it must be shown that at least 5% of the total number of transits analysed belong to the heavy vehicle category. The system must classify the vehicles into a minimum number of classes that can be traced back to the vehicle categories to which the speed limits currently prescribed for each of the vehicle classes apply, according to the category of road on which the system is installed (pursuant to art. 142(3) of the Code), with an indication of the number of vehicles that the system has not been able to classify. The classification test is considered successful if, both for each class and out of the total number analysed, the number of correctly classified vehicles is more than 90 per cent. THIRD SINGLE PLATE TEST, BOTH START AND STOP: comparison between the licence plate read by the OCR, if present, and the licence plate visible in the photo taken by the cameras, using the same analysis sample as in the classification test. The system is considered suitable if, for each of the two detection locations, inbound and outbound, it is able to correctly recognise the number plate for less than 95 per cent of the vehicles passed. FOURTH TEST PAIR OF POSTS: It is suggested that the pair of posts be configured with a speed limit close to zero (e.g. average speed limit of 5 km/h on the motorway), so that almost all vehicles passing through the section under consideration are considered to be in presumed violation. The test will involve a minimum of 300 total vehicles, randomly drawn from the total number of transits. For each vehicle coupling test campaign, it is suggested to start the normal operation of the stop station after a reasonable time after the start of the normal operation of the start station, in order to ensure that all vehicles within the route have already been detected by the start station, and thus the vehicle coupling test can be meaningful. In this way, the system is theoretically able to match all vehicles in transit to the stop portal from the moment it starts. It is suggested, in addition, that video footage be taken by means of a video surveillance camera (or similar) ~~completely~~ also independent of the violation detection system, to allow for better verification by the operator. For all transits coupled by the system, a comparison must be made between the frame collected by the start station and the one collected by the stop station, to verify that the system has coupled the same vehicle and that no malfunctions occur. A system is considered adequate if it is capable of correctly coupling the images of vehicles passing under the two stations for more than 95 per cent of those

	taken in the single session and of the total number passed; correct coupling means that the same vehicle must be represented in the image pair. To be successful, all transits must be correctly detected by the device and photographed within the declared area. **FUNCTIONALITY CHECKS ON A PERIODIC BASIS:** The data collection in connection with the test campaign will involve a total of at least 1,000 transits, under different lighting and environmental conditions, divided between the two start and stop stations (hereafter also referred to as start and stop), with random vehicle transits in all lanes. FIRST SINGLE STATION TEST, BOTH START AND STOP: The peripheral system must be configured to record and historise data and photos of each individual vehicle in transit. The system must not be able to access external databases to supplement any missing information (e.g: MCTC). The verification will be carried out on a specific pair of posts installed on a road or motorway carriageway. With the possible aid of a video surveillance camera (or similar), even independent of the violation detection system, a check will be carried out on the number of vehicles correctly detected and photographed by the station in relation to the total number of transited vehicles counted by analysing the video recording. The system is considered to be suitable if, for each of the two detection stations, input and output, it is able to correctly acquire images for a number of detections greater than or at least equal to 90% of the total processed in each session. SECOND SINGLE STATION TEST, BOTH START AND STOP: The class indicated by the peripheral system for each vehicle must be compared with what can be detected by the frame taken by the cameras, with a minimum of 150 vehicles in total, drawn randomly from the total number of transits, for each of the two portals. In order to assess the device's ability to classify vehicles correctly, it must be shown that at least 5 per cent of the total number of transits analysed belong to the heavy vehicle category. The system must classify the vehicles into a minimum number of classes that can be traced back to the vehicle categories to which the speed limits currently prescribed for each of the vehicle classes apply, according to the category of road on which the system is installed (pursuant to art. 142(3) of the Code), with an indication of the number of vehicles that the system has not been able to classify. The classification test is considered successful if, both for each class and out of the total number analysed, the number of correctly classified vehicles is more than 90 per cent. THIRD SINGLE PLATE TEST, BOTH START AND STOP: comparison between the licence plate read by the OCR, if present, and the licence plate visible in the photo taken by the cameras, using the same analysis sample as in the classification test. The system is considered suitable if, for each of the two detection locations, inbound and outbound, it is able to correctly recognise the number plate for more than 95 per cent of the vehicles passed.

	FOURTH TEST PAIR OF POSTS: It is suggested to configure the station pair with a speed limit close to zero (e.g. 5 km/h average speed limit on the motorway), so that almost all vehicles passing through the section under consideration are considered to be in presumed violation, and to start the normal operation of the stop station after a reasonable time from the start of normal operation, so as to ensure that all vehicles within the section have already been detected by the start station, and that the vehicle coupling test can therefore be meaningful. In this way, the system is theoretically able to match all vehicles in transit to the stop portal from the moment it starts. In addition, it is suggested that video footage be taken by means of a video surveillance camera (or similar), possibly independent of the violation detection system, to allow for better verification by the operator. For all transits coupled by the system, a comparison must be made between the frame collected by the start station and the one collected by the stop station, to verify that the system has coupled the same vehicle and that no malfunctions occur. A system is considered adequate if it is capable of correctly coupling the images of vehicles passing under the two stations for more than 95 per cent of those taken in the single session and of the total number passed; correct coupling means that the same vehicle must be represented in the image pair. To be successful, all transits must be correctly detected by the device and photographed within the declared area.

Table 12: Table of initial and periodic verifications

1. Simultaneous detection of vehicles (item 12 of device identification table)

INITIAL AND PERIODIC FUNCTIONALITY CHECKS: The checks at the place of use must include the simultaneous passage of vehicles, respecting safety conditions, both in the case of lanes with the same and opposite directions.

2.22 The devices must be taken out of service when

- tampering with any seals of the LAT;
- tampering with any manufacturer's seals;
- damage, breakage, failure of the device;
- as a precautionary measure, if the manufacturer or user considers that the device is no longer fit for service.

Devices that are out of service must be restored by the manufacturer or a person authorised to do so. The manufacturer shall, in the event that the relevant measurement-related parts of Group 1 have been involved in the re-commissioning of the device, indicate whether or not initial or periodic re-calibration is required, as applicable, provided that the components are the same as those subject to prototype type-authorisation.

2.23 In addition to periodic calibration and functionality checks, the device is subject to maintenance and/or overhaul checks as prescribed in the device's installation, use

and maintenance manual, which is part of the prototype type-authorisation documentation. After maintenance and/or overhaul, the manufacturer or party authorised to do so is responsible for ensuring that the device complies with the specifications of the sample deposited with MIT.

CHAPTER 3 - DOCUMENTATION TO BE SUBMITTED FOR APPLICATION FOR TYPE-AUTHORISATION

3.1 APPLICATION FOR TYPE AUTHORISATION

In order to apply for type-authorisation, the prototype of the device, together with the following documentation, must be submitted by PEC to the competent MIT office:

a) application for type-authorisation, on legal paper,
b) Receipt of payment for technical - administrative operations, referred to in Row I of Table VII.1 of the Rules;
c) detailed illustrative technical report of the device and its components, as well as the management software;
d) installation, operation and maintenance manual, containing at least the minimum information required by point 1.7.4.2 of Annex I of Directive 2006/42/EC and the installation geometry of the device. The manual must be digitally signed;
e) calibration certificates, reports of functional checks and laboratory tests referred to in Chapter 1;
f) Chamber of Commerce certificate of the company producing the device and a photocopy of a valid identity document of the legal representative;
g) declaration of ownership of the management software;
h) HASH code of the speed calculation part of the device software;
i) EU Declaration of Conformity of the WIM system components, relating to electrical safety, in accordance with Directive 2014/35/EU (low voltage - LVD) and electromagnetic compatibility, in accordance with Directive 2014/30/EU (electromagnetic compatibility - EMC) and Directive 2014/53/EU (radio equipment - RED), if relevant;
j) Declaration of conformity with the RoHS Directive according to the harmonised standards of Directive 2011/65/EU;
k) declaration of a certified copy of the documents referred to in the previous points.

If the documentation is not complete according to this list, the application must be supplemented according to the instructions of the competent organisational unit of the Directorate General for Road Safety and Road Transport.
The competent office reserves the right to request additional documentation, if necessary for the complete examination of the application for type-authorisation.
Each document will be validly deposited by the producer by sending it to the Certified Electronic Mail address of the organisational unit responsible for the preliminary

investigation of the procedure or by means of the MIT's file delivery portal, which allows the sending of files larger than 100 MB.
Reports (or Test Reports) of tests performed on the device must be:

- in Italian or, if in a language other than Italian, accompanied by a sworn translation;
- produced in original or certified copies and carried out by laboratories accredited by ACCREDIA or other accreditation bodies that are international signatories of mutual recognition agreements.

The type-authorisation of the device is formalised by executive order.

3.2 REQUEST FOR EXTENSION OF TYPE AUTHORISATION

With the type-authorisation extension procedure, the MIT extends the previous type-authorisation to new and different models and versions of the prototype with the same basic functions, following the modification and/or addition of one or more of the group 2 components and/or functions.
The competent office of the MIT verifies, for the modified and/or added components and functions, the fulfilment of the requirements defined in this document.
The extension of the type-authorisation is also formalised by means of an executive order.
In order to apply for an extension of type-authorisation, prototype components, if any, conforming to those tested must be submitted, together with the following documentation:

a) application on legal paper or via P.E.C. with stamp duty paid virtually, addressed to the competent organisational unit of the General Directorate for Road Safety and Road Transport;
b) receipt of payment for technical-administrative operations, as referred to in Row M of Table VII.1 of the Rules;
c) detailed technical illustrative report of the proposed new version of the device with its components;
d) digitally signed updated version of the installation, operation and maintenance manual, referred to in d) of paragraph 3.1 above;
e) test reports of the laboratory tests referred to in Chapter 1, carried out on new components;
f) possible update of the HASH code of the speed calculation part of the device software;
g) declaration of a certified copy of the documents referred to in the previous points.

If the documentation is not complete according to this list, the application must be supplemented according to the instructions of the competent organisational unit of the Directorate General for Road Safety and Road Transport.
The MIT reserves the right to request additional documentation if necessary for the complete examination of the application for extension of type-authorisation.

Each document will be validly deposited by the producer by sending it to the Certified Electronic Mail address of the organisational unit of the MIT responsible for the preliminary investigation of the procedure or by means of the MIT's file delivery portal, which allows the sending of files larger than 100 MB.
Reports (or Test Reports) of tests performed on the device must be:

- in Italian or, if in a different language, accompanied by a sworn translation;
- produced in original or certified copies and carried out by laboratories accredited by ACCREDIA or other accreditation bodies that are international signatories of mutual recognition agreements.

3.3 REQUEST TO TAKE OVER OWNERSHIP OF THE TYPE-AUTHORISATION

With the type-authorisation take-over procedure, the MIT authorises a change in type-authorisation ownership and possible subsequent extensions.
The application must also be submitted in the event of changes to the name, company name and registered office of the current holder of the type-authorisation.
The takeover is also formalised by means of a executive order.
To apply for takeover, the following documents must be submitted:

a) application on legal paper or via P.E.C. with stamp duty paid virtually, addressed to the competent organisational unit of the General Directorate for Road Safety and Road Transport, listing the decrees to be taken over;
b) receipt of payment for technical-administrative operations, as referred to in Row M of Table VII.1 of the Rules;
c) alternatively:
    1. in the event of a change in the company name, company name or registered office, the minutes, registered with the Internal Revenue Service, of the shareholders' meeting of the company by which the above is resolved;
    2. in the event of a sale, lease of a branch of business or merger by incorporation, the contract, registered with the Internal Revenue Service;
d) valid Chamber of Commerce certificate of the successor company;
e) sworn statement in lieu of an affidavit, pursuant to Presidential Decree no. 445 of 28 December 2000, dated 31 December 2023, in which the assigning company declares that it has duly carried out its production and marketing activities in accordance with the aforementioned decrees, and that it has not committed any violations thereof;
f) sworn statement in lieu of an affidavit, pursuant to Presidential Decree no. 445 of 28 December 2000, dated 31 January 2024, in which the transferee company declares that it has sufficient documentation, means and technical capacity to allow the project to remain unchanged and the subsequent production to conform to the prototypes already homologated;
g) digitally signed copies of the manuals mentioned in the decrees mentioned in (a), updated with the new header.

If the documentation is not complete according to this list, the application must be supplemented according to the instructions of the competent organisational unit of the Directorate General for Road Safety and Road Transport.
The MIT reserves the right to request additional documentation, should it be necessary for the complete examination of the request to take over ownership of the type-authorisation.
Each document will be validly deposited by the producer by sending it to the Certified Electronic Mail address of the organisational unit of the MIT responsible for the preliminary investigation of the procedure or by means of the MIT's file delivery portal, which allows the sending of files larger than 100 MB.

The Ministry for Infrastructure and Transport

ANNEX B

List of decrees approving devices and systems for detecting violations of maximum speed limits issued pursuant to Decree No 282 of the Minister of Infrastructure and Transport of 13 June 2017

DEVICE/SYSTEM	DECREE OF APPROVAL
CELERITAS MSE 2021	Executive Order no. 401 of 19/08/2024
TUTOR 3.0	Executive Order no. 305 of 20/06/2024
VERGILIUS PLUS	Executive Order no. 149 of 27/03/2024
CELERITAS MVD 2022	Executive Order no. 290 of 25/07/2023
VRS EVO 2	Executive Order no. 271 of 11/07/2023
T-EXSPEED	Executive Order no. 236 of 05/06/2023
K53800_SPEED	Executive Order no. 549 of 21/12/2021
TCS - Traffic Control System	Executive Order no. 378 of 09/09/2021
Autosc@n Speed	Executive Order no. 356 of 18/08/2021
CELERITAS MVD 2020	Executive Order no. 349 of 16/08/2021
AGUIA Red & Speed	Executive Order no. 48 of 01/03/2021
VELOCAR RED&SPEED EVO M	Executive Order no. 5240 of 31/08/2017