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⁽¹⁾ Text with EEA relevance.

EN

Acts whose titles are printed in light type are those relating to day-to-day management of agricultural matters, and are generally valid for a limited period.

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II

(Non-legislative acts)

INTERNATIONAL AGREEMENTS

Notice concerning the entry into force of the Framework Agreement on Comprehensive Partnership and Cooperation between the European Union and its Member States, of the one part, and the Socialist Republic of Viet Nam, of the other part

Framework Agreement on Comprehensive Partnership and Cooperation between the European Union and its Member States, of the one part, and the Socialist Republic of Viet Nam, of the other part ⁽¹⁾ entered into force on 1 October 2016, the procedure provided for in Article 63(1) of the Framework Agreement having been completed on 29 September 2016.

⁽¹⁾ OJ L 329, 3.12.2016, p. 8.

REGULATIONS

COMMISSION DELEGATED REGULATION (EU) 2017/67

of 4 November 2016

amending Annex II to Regulation (EU) No 652/2014 of the European Parliament and of the Council laying down provisions for the management of expenditure relating to the food chain, animal health and animal welfare, and relating to plant health and plant reproductive material by supplementing the list of animal diseases and zoonoses in that Annex

THE EUROPEAN COMMISSION,

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

Having regard to Regulation (EU) No 652/2014 of the European Parliament and of the Council of 15 May 2014 laying down provisions for the management of expenditure relating to the food chain, animal health and animal welfare, and relating to plant health and plant reproductive material, amending Council Directives 98/56/EC, 2000/29/EC and 2008/90/EC, Regulations (EC) No 178/2002, (EC) No 882/2004 and (EC) No 396/2005 of the European Parliament and of the Council, Directive 2009/128/EC of the European Parliament and of the Council and Regulation (EC) No 1107/2009 of the European Parliament and of the Council and repealing Council Decisions 66/399/EEC, 76/894/EEC and 2009/470/EC ⁽¹⁾ and in particular Article 10(2) thereof,

Whereas:

- (1) The specific conditions to be taken into account as referred to in Article 10(2)(a) and (c) of Regulation (EU) No 652/2014 are met for sheep and goat plague, listed by the World Organisation for Animal Health (OIE) as 'peste des petits ruminants', sheep pox, goat pox and lumpy skin disease that are listed only in Annex I to that Regulation, which includes diseases that qualify for funding under Article 6 of that Regulation concerning emergency measures.
- (2) Sheep and goat plague is a highly contagious viral disease of sheep and goats, endemic in East Africa, the Arabian Peninsula, the Middle Eastern countries and India. It is widespread in Africa and Asia and it has been reported in Turkey and northern Africa countries since 2014.
- (3) Sheep and goat plague is transmitted via direct contact, and the disease would mainly be transferred to infection-free areas by transport of infected animals. While goats are considered to be more susceptible than sheep, the infection in the latter may go unnoticed.
- (4) Sheep pox and goat pox are serious and highly contagious diseases of sheep and goat caused by capripoxviruses with a severe impact on the profitability of sheep and goat farming, causing disturbance to trade within the Union and export to third countries.
- (5) Sheep pox and goat pox are endemic in North African countries, Middle Eastern and Asian countries, with recurrent incursions into Greece and Bulgaria from a neighbouring third country.

⁽¹⁾ OJ L 189, 27.6.2014, p. 1.

- (6) Lumpy skin disease is a highly infectious viral disease of cattle that can be transmitted by insect vectors and which can have a severe impact on the profitability of cattle farming causing disturbance to trade within the Union and export to third countries. It is endemic in most African countries and in the years 2012 and 2013 it has spread to the Middle East and Turkey. Several outbreaks have occurred in Greece since August 2015 and the disease spread in Bulgaria in March 2016, and subsequently to a number of western Balkan countries.
- (7) The epidemiological situation of sheep pox, goat pox and lumpy skin disease is evolving rapidly spreading also in the Union territory with significant negative impact on livestock production and trade.
- (8) In addition, as requested by the Commission, the European Food Safety Authority (EFSA) delivered scientific opinions in relation to surveillance measures to be implemented by the Union for the early detection of sheep and goat plague ⁽¹⁾, sheep pox, goat pox ⁽²⁾ and lumpy skin disease ⁽³⁾ to react accordingly to avoid spread of the diseases and eradicate them in a short time.
- (9) Therefore, in order to implement appropriate annual or multiannual surveillance programmes for the early detection of the abovementioned diseases, it is necessary to add sheep and goat plague, sheep pox, goat pox and lumpy skin disease in the list of animal diseases and zoonoses in Annex II to Regulation (EU) No 652/2014. Article 10(2) of Regulation (EU) No 652/2014 empowers the Commission to adopt delegated acts in order to supplement the list of animal diseases and zoonoses set out in Annex II to that Regulation. The Commission can supplement the list set out in Annex II to Regulation (EU) No 652/2014 only by amending that Annex.
- (10) Annex II to Regulation (EU) No 652/2014 should therefore be amended accordingly,

HAS ADOPTED THIS REGULATION:

Article 1

In Annex II to Regulation (EU) No 652/2014, the following animal diseases are added: 'sheep and goat plague, sheep pox, goat pox and lumpy skin disease'.

Article 2

This Regulation shall enter into force the day after publication in the *Official Journal of the European Union*.

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

Done at Brussels, 4 November 2016.

For the Commission
The President
Jean-Claude JUNCKER

⁽¹⁾ EFSA AHAW Panel (EFSA Panel on Animal Health and Welfare), 2015. Scientific Opinion on peste des petits ruminants *EFSA Journal* 2015;13 (1):3985.

⁽²⁾ EFSA AHAW Panel (EFSA Panel on Animal Health and Welfare), 2014. Scientific Opinion on sheep and goat pox. *EFSA Journal* 2014;12 (11):3885.

⁽³⁾ EFSA AHAW Panel (EFSA Panel on Animal Health and Welfare), 2016. Urgent advice on lumpy skin disease. *EFSA Journal* 2016;14 (8):4573.

COMMISSION IMPLEMENTING REGULATION (EU) 2017/68**of 9 January 2017****amending Regulation (EC) No 121/2008 laying down the method of analysis for the determination of starch content in preparations of a kind used in animal feeding (CN code 2309)**

THE EUROPEAN COMMISSION,

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

Having regard to Regulation (EU) No 952/2013 of the European Parliament and of the Council of 9 October 2013 laying down the Union Customs Code ⁽¹⁾, and in particular Article 57(4) and Article 58(2) thereof,

Whereas:

- (1) The classification of preparations of a kind used in animal feeding under the subheadings of heading 2309 of the Combined Nomenclature annexed to Council Regulation (EEC) No 2658/87 ⁽²⁾ is determined on the basis of the product's content of starch.
- (2) For the purposes of that classification, Commission Regulation (EC) No 121/2008 ⁽³⁾ provides for use of an enzymatic analytical method for the determination of starch content in certain preparations.
- (3) Where soya products are present in those preparations, their content of starch can be ascertained using the polarimetric method or the enzymatic analytical method. Substantially different results are obtained depending on the method used, and the polarimetric method has been found not to be suitable for determining the starch content of the preparations with soya products as it gives inaccurate results.
- (4) Soya products should therefore be added to the list of feed materials set out in Article 1 of Regulation (EC) No 121/2008 in respect of which the starch content of the preparation is to be determined using the enzymatic analytical method in order to clarify which method the customs authorities are to use and thus ensure a uniform classification in the Member States.
- (5) Article 1 of Regulation (EC) No 121/2008 should therefore be amended accordingly.
- (6) The measures provided for in this Regulation are in accordance with the opinion of the Customs Code Committee,

HAS ADOPTED THIS REGULATION:

Article 1

In Article 1 of Regulation (EC) No 121/2008, the following point (k) is added:

‘(k) soya products.’

Article 2

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

⁽¹⁾ OJ L 269, 10.10.2013, p. 1.

⁽²⁾ Council Regulation (EEC) No 2658/87 of 23 July 1987 on the tariff and statistical nomenclature and on the Common Customs Tariff (OJ L 256, 7.9.1987, p. 1).

⁽³⁾ Commission Regulation (EC) No 121/2008 of 11 February 2008 laying down the method of analysis for the determination of starch content in preparations of a kind used in animal feeding (CN code 2309) (OJ L 37, 12.2.2008, p. 3).

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

Done at Brussels, 9 January 2017.

*For the Commission,
On behalf of the President,
Stephen QUEST
Director-General
Directorate-General for Taxation and Customs Union*

COMMISSION IMPLEMENTING REGULATION (EU) 2017/69**of 12 January 2017****establishing the standard import values for determining the entry price of certain fruit and vegetables**

THE EUROPEAN COMMISSION,

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

Having regard to Regulation (EU) No 1308/2013 of the European Parliament and of the Council of 17 December 2013 establishing a common organisation of the markets in agricultural products and repealing Council Regulations (EEC) No 922/72, (EEC) No 234/79, (EC) No 1037/2001 and (EC) No 1234/2007 ⁽¹⁾,

Having regard to Commission Implementing Regulation (EU) No 543/2011 of 7 June 2011 laying down detailed rules for the application of Council Regulation (EC) No 1234/2007 in respect of the fruit and vegetables and processed fruit and vegetables sectors ⁽²⁾, and in particular Article 136(1) thereof,

Whereas:

- (1) Implementing Regulation (EU) No 543/2011 lays down, pursuant to the outcome of the Uruguay Round multilateral trade negotiations, the criteria whereby the Commission fixes the standard values for imports from third countries, in respect of the products and periods stipulated in Annex XVI, Part A thereto.
- (2) The standard import value is calculated each working day, in accordance with Article 136(1) of Implementing Regulation (EU) No 543/2011, taking into account variable daily data. Therefore this Regulation should enter into force on the day of its publication in the *Official Journal of the European Union*,

HAS ADOPTED THIS REGULATION:

Article 1

The standard import values referred to in Article 136 of Implementing Regulation (EU) No 543/2011 are fixed in the Annex to this Regulation.

Article 2

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

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

Done at Brussels, 12 January 2017.

*For the Commission,
On behalf of the President,*

Jerzy PLEWA

Director-General

Directorate-General for Agriculture and Rural Development

⁽¹⁾ OJ L 347, 20.12.2013, p. 671.

⁽²⁾ OJ L 157, 15.6.2011, p. 1.

ANNEX

Standard import values for determining the entry price of certain fruit and vegetables

(EUR/100 kg)		
CN code	Third country code ⁽¹⁾	Standard import value
0702 00 00	IL	269,9
	MA	121,7
	SN	204,0
	TR	106,0
	ZZ	175,4
0707 00 05	MA	86,1
	TR	166,7
	ZZ	126,4
0709 91 00	EG	144,1
	ZZ	144,1
0709 93 10	MA	240,8
	TR	229,3
	ZZ	235,1
0805 10 20	EG	47,5
	IL	126,4
	MA	56,5
	TR	75,0
	ZZ	76,4
0805 20 10	IL	160,9
	MA	70,1
	ZZ	115,5
0805 20 30, 0805 20 50, 0805 20 70, 0805 20 90	EG	97,9
	IL	111,8
	JM	125,6
	MA	93,5
	TR	99,1
	ZZ	105,6
	ZZ	105,6
0805 50 10	TR	78,9
	ZZ	78,9
0808 10 80	CN	144,5
	US	72,4
	ZZ	108,5
0808 30 90	CL	307,7
	CN	72,4
	TR	133,1
	ZZ	171,1

⁽¹⁾ Nomenclature of countries laid down by Commission Regulation (EU) No 1106/2012 of 27 November 2012 implementing Regulation (EC) No 471/2009 of the European Parliament and of the Council on Community statistics relating to external trade with non-member countries, as regards the update of the nomenclature of countries and territories (OJ L 328, 28.11.2012, p. 7). Code 'ZZ' stands for 'of other origin'.

DECISIONS

COMMISSION DECISION (EU) 2017/70

of 25 July 2016

on the State aid SA.37185 (2015/C) (ex 2013/N) which Spain has granted and partially implemented for the funding of the Centro de ensayos de alta tecnología ferroviaria de Antequera (CEATF)

(notified under document C(2016) 4573)

(Only the Spanish text is authentic)

(Text with EEA relevance)

THE EUROPEAN COMMISSION,

Having regard to the Treaty on the Functioning of the European Union, and in particular the first subparagraph of Article 108(2) thereof,

Having regard to the Agreement on the European Economic Area, and in particular Article 62(1)(a) thereof,

After giving notice to the parties concerned to submit their comments pursuant to the provisions cited above ⁽¹⁾ and having regard to their comments,

Whereas:

1. PROCEDURE

- (1) By letter dated 5 August 2013, Spain prenotified to the Commission an aid for the funding of a test centre for high technology railway in Antequera ('Centro de Ensayos de Alta Tecnología Ferroviaria de Antequera', the 'CEATF'). The notification was registered on 30 September 2013. The Commission requested supplementary information by letters dated 28 November 2013, 28 March, 25 July and 5 December 2014, to which the Spanish authorities answered by letters dated 6 February, 20 May, 15 October 2014 and 23 January 2015.
- (2) By letter dated 23 March 2015, the Commission notified Spain of its decision to initiate proceedings pursuant to Article 108(2) of the Treaty on the above-mentioned measure.
- (3) The decision of the Commission to initiate proceedings ('the opening decision') was published in the *Official Journal of the European Union* ⁽²⁾. The Commission invited interested parties to submit their comments on the aid.
- (4) At the request of the Commission, a meeting was held with the Spanish authorities on 28 May 2015. Spain submitted its observations on the opening decision on 2 July 2015. The Commission requested additional information by letters dated 8 September, 15 October 2015 and 15 January 2016, to which the Spanish authorities replied by letters dated 28 September, 13 November 2015 and 21 January 2016.
- (5) The Commission received comments from companies operating in the railway sector on 7, 9, 10, 16, 17 and 23 July 2015. Those ten companies are railways operators, rolling stock manufacturers or companies which provide virtual testing facilities or which test materials.

⁽¹⁾ OJ C 188, 5.6.2015, p. 10.

⁽²⁾ Cf. footnote 1.

- (6) The Commission forwarded those comments to Spain by letter dated 24 September 2015, to which Spain replied by letter dated 14 October 2015.
- (7) Finally, on 26 July 2013, the Spanish authorities submitted the project, in the form subsequently notified to DG Competition on 30 September 2013, to Directorate-General Regional and Urban Policy of the Commission as a 'Major Project' to be financed under a Multi-Regional Operational Programme in force in Spain at the time ^(?). They withdrew the project by letter dated 14 April 2015.

2. DETAILED DESCRIPTION OF THE MEASURE

2.1. Objective and description of the CEATF project

- (8) The notified measure concerns the public financing of a research infrastructure designed to operate as a test centre for high-speed rolling stock and related equipment. The objective of the CEATF project is to provide a unique infrastructure in Europe to allow the required testing, validation and approval processes to be carried out for high-speed rolling stock.
- (9) The CEATF project consists of a railway circuit where trains can run at very high speeds (up to 520 km/h) and auxiliary installations that allow research, approval and tuning of mobile rail equipment, infrastructure and superstructure elements. More specifically, the facilities of the centre allow research on railway dynamics, on the new generation of traction and braking for trains, and on signalling systems of rail infrastructure.
- (10) The railway circuit is a ring of 58 km in length with a straight section of 9 km that allows speeds of up to 520 km/h to be reached. The circuit comprises curves of large radius that, combined with specific cant, allow running at a certain speed and lateral acceleration.
- (11) Spain indicated that the railway circuit is designed to be used for the type approval of rolling stock that travels up to 520 km/h, corresponding to type approval on large and very large radius curves ⁽⁴⁾.
- (12) The circuit is also equipped with two sections of double tracks and platforms that can be used for type approval of rolling stock that travels at 250 km/h ⁽⁵⁾ or under, as well as for infrastructure and superstructure tests.
- (13) The circuit is equipped with connection branches, which can be used for type approval on small and very small curves.
- (14) The auxiliary installations include the Integrated Centre for Rail Services ('Centro Integral de Servicios Ferroviarios', 'the CISF') which hosts laboratories, offices and training rooms. The laboratories consist of a multifunctional workshop and test preparation area that should facilitate assembly and disassembly of train equipment, tasks of development of the different on-board systems and research, development and innovation activities ('R & D&I'). A part of this area is dedicated to tests on optimal rolling stock behaviour for future validation and approval of railway vehicles.
- (15) The auxiliary installation also include rails for specific testing, a multitenion substation to provide energy to the circuits, and a traffic control centre.

^(?) Multi-regional Operational Programme 'Research, Development and Innovation (R & D&I) for and by Enterprises — Technology Fund' adopted by the Commission on 7 December 2007 (Decision C/2007/6316). The Programme engages Community support in all Spanish regions within the framework of the Convergence and Regional Competitiveness and Employment Objectives.

⁽⁴⁾ Second submission of the Spanish authorities, received and registered on 20 May 2014, p. 12, confirmed in their submission of 22 January 2015.

⁽⁵⁾ As described in Section 2.3.1 below, the project underwent technical design changes during the preliminary feasibility study phase until it reached its final form in April 2013, when ADIF submitted the project to the Ministry of Public Works and Transports.

- (16) The construction and operation of the railway circuit would be entrusted to a Public-Private Partnership (PPP), grouping ADIF (*Administrador de Infraestructura ferroviaria*, see recital 24 below) and a consortium of undertakings. The consortium of undertakings should take the legal form of a Special Purpose Vehicle (SPV, 'Sociedad de Propósito Específico' — 'SPE') ⁽⁶⁾, which will be responsible for the construction of the test centre and then for its operation for 25 years. ADIF is appointed as the owner of the CEATF.
- (17) Before the invitation to tender which was published in the Spanish official journal on 2 July 2013 ⁽⁷⁾, the Spanish authorities indicated that meetings were held with potential interested companies and that coordinated surveys were carried out. According to them, the replies confirmed a high level of interest within the private sector in the implementation of the project ⁽⁸⁾. The companies that showed major interest in the project are companies from the building sector (40,43 % of the questionnaires received) and rolling stock manufacturers (12,76 % of the questionnaires received). They indicated their interest in participating in the project and taking risks subject to some guarantees on their investment, since the information available on the profitability at the time of the study was not sufficient to commit firmly ⁽⁹⁾.
- (18) However, the first call for tender to select the SPV was declared void in October 2013, as no bidder had expressed interest in the project. The process of selecting a bidder was then suspended while awaiting the final decision of the Commission on the project.
- (19) The Spanish authorities confirmed that only economic activities are to be performed at the CEATF. If ADIF or its subsidiary ADIF Alta Velocidad were to use the centre for their own tests, they would do so under the same conditions as other users, during the 25 years of the contract period.
- (20) The Spanish authorities indicated that three railway test centres are currently in operation in Europe (Cerhenice (Velim) in the Czech Republic, Wildenrath in Germany and Valenciennes in France). According to them, those facilities only allow for testing at lower speeds (see Table 1 below).

Table 1

Comparison between other operating railway test centres in Europe, one in the US and the CEATF (source: Spanish authorities)

	Velim (Czech Republic)	Wegberg-Wildenrath (Germany)	Valenciennes ⁽¹⁾ (France)	TTCI — Puebla (USA)	CEATF (Spain)
Year of construction	1963	1997	1999	1998	To be built
Number of circuits	2	5	4	4	1
Length (km)	3,9 and 13,3	From 0,4 to 6,1	From 1,6 to 2,7	From 5,6 to 21,7	9 straight 58 ring
Top speed (km/h)	210	160 (large circuit)	110	265 (large circuit)	520
Owner	Railway Research Institute, branch of the national rail operator	Siemens	CEF SA (61 % owned by Alstom)	Association of American railroads	National rail operator — ADIF

Source: Spanish authorities.

⁽¹⁾ <http://www.c-e-f.fr/>

⁽⁶⁾ See Section 2.4 of the opening decision for a more detailed description.

⁽⁷⁾ Spanish official journal (BOE) No 157, 2 July 2013.

⁽⁸⁾ Deloitte, 'Final conclusions on the questionnaires received on the project for the development, construction, maintenance and operation of ADIF's railway ring in Antequera under public-private partnership', 8 October 2012.

⁽⁹⁾ Executive summary of the Deloitte report, reproduced in the submission of the Spanish authorities of 22 January 2015.

- (21) The Spanish authorities indicated that the Spanish rolling stock manufacturers most commonly use, for on track-testing, the facilities offered by Velim and Wildenrath, but also the test centre TTCI of Puebla in the United States.
- (22) Testing of high-speed rolling stock is also carried out on railways in commercial use that have a maximum design speed of 350 km/h, with tests being carried out at up to 385 km/h as required by the standard (10 % over the nominal speed of the train). The tests are performed at night when there are no commercial passenger train services.

2.2. The beneficiary

- (23) ADIF, as intended owner of the Centre, has requested public funding for the construction of the CEATF.
- (24) ADIF, created in 2005, is a 100 % state-owned company that operates under the responsibility of the Ministry of Public Works and Transport ('Ministerio de Fomento'). ADIF is the owner of the Spanish railway infrastructure and is responsible for its management (construction, maintenance, repair and administration).
- (25) A new publicly-owned company named ADIF-Alta Velocidad was created by Royal Decree-Law 15 of 13 December 2013 on the restructuring of ADIF ⁽¹⁰⁾. As a result, the branch responsible for the construction and management of the conventional national railway network (ADIF) is now separate from the branch in charge of the management of high-speed railway lines (ADIF Alta Velocidad).
- (26) According to the Spanish authorities, ADIF's activities include the construction and administration of rail infrastructure comprising tracks, stations and freight terminals, managing rail traffic, distributing capacity to rail operators, collection of fees for infrastructure, station and freight terminal use and operation of its own assets (such as industrial and intellectual property portfolio). Those activities constitute economic activities. Other economic activities include rental of space for shops, trade fairs, exhibitions, stands, promotions or shows in ADIF stations ⁽¹¹⁾. Those activities represent 99,97 % of ADIF's revenue. The Spanish authorities however indicated that ADIF may also perform other activities that, in their view, are of a non-economic nature, for example research and development (R & D).

2.3. Description of the aid measure

2.3.1. Design of the project, legal basis and financing

- (27) In February 2009, the Ministry of Public Works and Transport entrusted ADIF with the task of identifying feasible options for a rail-testing facility that would allow R & D&I for advanced solutions in the high-speed railway sector.
- (28) On 15 December 2009, ADIF and the Council of Andalucía ('Junta de Andalucía', via its Council of Innovation, Science and Enterprises) formalised a Memorandum of Understanding, setting out the commitment of both institutions to create the Railway Technology Centre ('Centro de Tecnologías Ferroviarias', 'the CTF' ⁽¹²⁾) at the Andalucía Technology Park and a rail-testing facility, namely the CEATF, in the province of Malaga.
- (29) A first version of the project which was presented to the Ministry of Public Works and Transport on 1 June 2010 involved the construction of a main ring circuit of 57 km length for high-speed trains (with a maximum testing speed of 450 km/h) and two secondary circuits (20 km and 5 km length) for testing metros and tramways (with a maximum speed of 220 km/h). Different locations for the main circuit and different design options were under examination. The initial document presented four alternatives for the main circuit and two for the secondary circuits and was elaborated in order to launch the environmental impact assessment of the project.

⁽¹⁰⁾ *Ley 39/2003 del Sector Ferroviario*, Published in the Spanish official journal (BOE) No 299, of 14 December 2013.

⁽¹¹⁾ Commercially managed by ADIF's Passenger Stations Department (source: www.adif.es).

⁽¹²⁾ The railway technology cluster operating in the same region, see recital 12 of the opening decision.

- (30) In parallel with ADIF's studies designed to identify the most suitable option for a high-speed railway test centre, Spain included proposals for such a project in its Operational Programme (under Council Regulation (EC) No 1083/2006⁽¹³⁾), in order to obtain ERDF funds⁽¹⁴⁾.
- (31) On 1 December 2010, ADIF provisionally approved the 'Informative study for Testing and experimentation facilities associated with the ADIF railway technology centre in Malaga'. The document presented a multicriteria analysis of two alternatives for the main circuit (1A and 1B) and two alternatives for the secondary circuit (1B1 and 1B2). The document concluded that alternatives 1B and 1B1 were the most appropriate.
- (32) An agreement ('convenio de colaboración') for the financing of the construction and equipment of a high-speed technology railway centre was signed between the Ministry of Science and Innovation and ADIF on 27 December 2010. In particular, the State agreed to provide financing to ADIF in the form of loans and a grant. The grant was qualified as an 'advance' from the ERDF funds⁽¹⁵⁾.
- (33) ADIF started to receive transfers from the State in January 2011. According to the Spanish authorities⁽¹⁶⁾, those advances were partly used for feasibility studies and partly for the construction of laboratories (the CISF) at the location where the CEATF project was intended to be established in the region of Antequera.
- (34) After a long administrative and consultative process, and following some comments during the first public consultations, ADIF decided to reconsider the scope of the project. A new alternative (1C) consisting of a circuit where trains can reach a speed of 520 km/h on the straight section and removing the secondary circuits (and replacing them by two portions of connected tracks to the main circuits) was introduced in the documents and further analysed.
- (35) ADIF then carried out an additional investigation and drew up the 'Basic Plan for the test and research facilities of the ADIF Railway Technology Centre in Malaga. Main and secondary circuit and connections'. This document, based on alternative 1C, presented the project as described in Section 2.1 above. This plan was submitted to the Directorate-General for Railways of the Ministry of Public Works and Transport, which decided to launch a public consultation on 8 April 2013⁽¹⁷⁾.
- (36) Following the public consultation, the project was approved at ministerial level on 27 June 2013 (by the Directorate-General for Railways of the Ministry of Public Works and Transport), subject to the final approval of the Council of Ministers.
- (37) On 28 June 2013, the Council of Ministers formally approved the project⁽¹⁸⁾ and its financing and authorised the Ministry of Public Works and Transport to launch the tender, via ADIF, for the construction and exploitation of the CEATF⁽¹⁹⁾.
- (38) Consequently, the financing of the notified project was first based on the agreement of 27 December 2010 and then on the Decision of the Council of Ministers of 28 June 2013.

⁽¹³⁾ Council Regulation (EC) No 1083/2006 of 11 July 2006 laying down general provisions on the European Regional Development Fund, the European Social Fund and the Cohesion Fund and repealing Regulation (EC) No 1260/1999 (OJ L 210, 31.7.2006, p. 25).

⁽¹⁴⁾ Minutes of the meeting of the 'Comité de seguimiento del programa operativo de I+D+I por y para el beneficio de las empresas — Fondo tecnológico 2007-2013' — 11 June 2010. The Committee is chaired by the General Director for ERDF in the Spanish Ministry of Economy and attended by representatives of the participants in the Operational Programme (both public administrations and companies) and the Commission.

⁽¹⁵⁾ The Spanish authorities submitted the text of the agreement by email dated 2 July 2015.

⁽¹⁶⁾ Spanish authorities' emails of 1 and 8 June 2015 confirmed in submission of 13 November 2015, page 5 and annexes to it.

⁽¹⁷⁾ Publication on the Spanish Official Journal (BOE), 17 April 2013.

⁽¹⁸⁾ In accordance with the technical characteristics set out as definite (maximum speed, number and shape of circuit, location and type of rolling stock to be tested on).

⁽¹⁹⁾ Resolution of the State Department for Infrastructure, Transport and Housing endorsing the project and presenting its objectives and the forthcoming process. See recital 10 of the opening decision.

2.3.2. *The aid instrument*

- (39) According to the Decision of 28 June 2013, the total costs of the project amount to EUR 358,6 million ⁽²⁰⁾. The public financing covers the full costs of the project and is to be granted by the Ministry of Economy and Competitiveness in the following way:
- (a) EUR 99,6 million in the form of loans (EUR 91,3 million from Convenio INNVENTA 2010, EUR 1,7 million from Programa INNPLANTA 2010 and EUR 6,6 million from Programa INNPLANTA 2011) ⁽²¹⁾.
- (b) EUR 259 million in the form of a grant, paid from the general State budget and qualified as 'advances' from the funds of the European Regional Development Fund (ERDF) (EUR 253,2 million from Convenio INNVENTA 2010, EUR 3,9 million through calls from Programa INNPLANTA 2010 and EUR 1,9 million from Programa INNPLANTA 2011).
- (40) Concerning the loans to be granted to ADIF for the project and described in recital 39(a) above, the Spanish authorities provided the following details:

Table 2

Structure and repayment of the loans of the CEATF project

PROGRAMME	INTEREST RATE (%)	REPAYMENT PERIOD	MAXIMUM SUM (EUR million)
INNVENTA 2010	1,17	2016-2024	91,3
INNPLANTA 2010	1,17	2015-2025	1,7
INNPLANTA 2011	0,00	2014-2018	0,8
	3,06	2015-2025	5,8
			99,6

Source: Spanish authorities.

- (41) The loans are remunerated at different rates, depending on the tranches and programmes under which they are granted.
- (42) In order to compare the interest rates of the above-mentioned loans with the actual market rates, the Spanish authorities provided a list of commercial loans granted to ADIF/ADIF Alta velocidad over the past five years, together with their conditions ⁽²²⁾ (EIB excluded):
- (a) In 2010, ADIF was granted seven loans: three with a fixed interest rate of 4,036 % to 4,580 %, the four others were granted at variable interest rates calculated on the Euribor rate at 3 to 12 months, to which a margin of 100 to 170 basis points was applied depending on the duration of the loan;
- (b) In 2011, ADIF was granted 11 loans with a variable interest rate calculated on the Euribor rate at 3 to 6 months to which a margin of 210 to 250 basis points was applied depending on the duration of the loan. For instance, on 8 April 2011, ADIF was granted a loan of EUR 75 million with a duration of seven years with a variable interest rate calculated on the Euribor rate at six months, to which a margin of 230 basis points was applied (with a three year grace period and semestral reimbursement);

⁽²⁰⁾ The exact amount is EUR 358 552 309,00 rounded up to EUR 358,6 million; see the Decision of the Council of Ministers of 28 June 2013. [http://prensa.adif.es/ade/u08/GAP/Prensa.nsf/0/80A8FA05AE117307C1257B9B00284BC1/\\$file/130628%20Anillo%20Ferroviario%20Antequera%20Consejo%20Ministros.pdf?OpenElement](http://prensa.adif.es/ade/u08/GAP/Prensa.nsf/0/80A8FA05AE117307C1257B9B00284BC1/$file/130628%20Anillo%20Ferroviario%20Antequera%20Consejo%20Ministros.pdf?OpenElement)

⁽²¹⁾ Source: p. 85 of the notification memorandum (September 2013) complemented by email of 2 July 2015 and submission of 13 November 2015. The structure of the financing in the form of a grant (qualified as 'advance grant') and loans originates from the agreement signed in 2010 but the budget has been updated after the decision taken on 28 June 2013.

⁽²²⁾ They listed all the loans obtained by ADIF and ADIF-Alta Velocidad but with effect from 1 January 2013, the date on which ADIF split into ADIF and ADIF-Alta Velocidad. Assets related to the railway circuit have remained within ADIF.

- (c) The Commission notes that the basis points margin applied to the loans granted to ADIF increased in 2013 and 2014, up to 450 basis points ⁽²³⁾.

2.3.3. The funds already disbursed to ADIF

- (43) Spain also indicated that, by November 2015, ADIF had received a total net amount of EUR 139,9 million comprising 'advance grants' and loans. Tables 3, 4 and 5 below describe in detail the financing received by ADIF from January 2011 onwards:

Table 3

Updated figures of amounts received by ADIF — November 2015

(EUR million)

	INNVENTA	INNPLANTA 2010	INNPLANTA 2011	TOTAL (net)
Advance grants	130,0	3,9	1,25	135,2
Loans	—	1,7	3,0	4,7
TOTAL	130,0	5,6	4,2	139,9

Source: Spanish authorities.

Table 4

Details of the tranches of the grants

ADVANCE GRANTS				
	Date	Activity		Amounts (in EUR)
Convenio Innventa				
(1)	17.1.2011			30 000 000
(2)	17.1.2012			100 000 000
			Total Innventa (1 + 2)	130 000 000
Programa Innplanta 2010				
(3)	17.1.2011	Act 2		3 023 790
(4)	11.1.2012	Act 2		966 210
(5)	28.2.2013	Act 2	<i>reimbursement</i>	– 25 084
			Total Innplanta 2010 (3 + 4 + 5)	3 964 916

⁽²³⁾ In 2012, the fixed interest rate was 4,884 % and the variable interest rate was calculated on the Euribor rate at 3 to 6 months to which a margin of 275 to 400 basis points was applied depending on the duration of the loan. In 2013, the fixed interest rate was 6,28 % and the variable interest rate was calculated on the Euribor rate at 6 months to which a margin of 400 to 450 basis points was applied depending on the amount of the loan.

ADVANCE GRANTS				
	Date	Activity		Amounts (in EUR)
Programa Innplanta 2011				
(6)	2.5.2012	Act 16		161 000
(7)	13.2.2013	Act 16		857 500
(8)	10.1.2014	Act 16		857 500
(9)	16.7.2014	Act 16	<i>reimbursement</i>	- 627 591
			Total Innplanta 2011 (6 + 7 + 8 + 9)	1 248 409
(10)	Total all programmes disbursed (1 + 2 + 3 + 4 + 6 + 7 + 8)		135 866 000	
(11)	Total all programmes reimbursed (5 + 9)		- 652 675	
Total all programmes remaining (net) (10 + 11)			135 213 325,00	

Source: Spanish authorities.

Table 5

Details of the tranches of the loans with interest rate to be applied

LOANS				
	Date	Activity	Interest rate (%)	Amounts (in EUR)
Convenio Innventa				
			Total	00
Programa Innplanta 2010				
(1)	17.1.2011	Act 2	1,17	1 295 910
(2)	11.1.2012	Act 2	1,17	414 090
(3)	28.2.2013	Act 2	1,17	<i>reimbursement</i> -10 750
			Total Innplanta 2010 (1 + 2 + 3)	1 699 250

LOANS					
	Date	Activity	Interest rate (%)		Amounts (in EUR)
Programa Innplanta 2011					
(4)	2.5.2012	Act 13	3,06		236 000
(5)	13.2.2013	Act 13	3,06		5 087 000
(6)	27.11.2013	Act 13	3,06	<i>reimbursement</i>	- 2 839 388
(7)	2.5.2012	Act 16	3,06		69 000
(8)	13.2.2013	Act 16	3,06		367 500
(9)	10.1.2014	Act 16	3,06		367 500
(10)	16.7.2014	Act 16	3,06	<i>reimbursement</i>	- 268 467
				Total Innplanta 2011 (4 + 5 + 6 + 7 + 8 + 9 + 10)	3 019 145
(11)	Total all programmes disbursed (1 + 2 + 4 + 5 + 7 + 8 + 9)				7 837 000
(12)	Total all programmes reimbursed (3 + 6 + 10)				- 3 118 605
Total all programmes remaining (net) (11 + 12)					4 718 395

Source: Spanish authorities.

- (44) The total ⁽²⁴⁾ amount disbursed by the Spanish State to ADIF is EUR 143 703 000, which consists of EUR 135 866 000 in grants and EUR 7 837 000 in loans. The Commission notes that in the period 2011-2014 according to the information, provided by the Spanish authorities, ADIF has already paid back EUR 652 675 of the grants and EUR 3 118 605 of the loans. According to Spanish authorities, EUR 139 931 720 (net) remains outstanding, including EUR 135 213 325 in grants and EUR 4 718 395 in loans. The Spanish authorities indicated that, of that sum, ADIF has already spent EUR 20,46 million ⁽²⁵⁾.
- (45) In the context of the formal investigation, the Spanish authorities confirmed that the EUR 20,46 million which had already been spent originated from the above-mentioned programmes (INNVENTA 2010, INNPLANTA 2010 and 2011) and that no expenditure has been covered by ADIF's resources originating from its economic activities. In addition, they provided a list of the contracts signed and works performed (see recital 33 above referring to the works performed). Each contract was categorised depending on its object and the component of the overall project in respect of which it was concluded. ADIF spent EUR 6,54 million on studies and preliminary works for the test circuits and EUR 13,92 million on the construction and equipment of the CISF.

⁽²⁴⁾ The figure of 139 931 720 is already net of the partial reimbursement of the loans and grants.

⁽²⁵⁾ EUR 19,8 million mentioned in submission of 20 May 2014, Annex II 'negative consequences of the non-realisation of the project', p. 10. Updated to EUR 20,46 million in the submission of the Spanish authorities of 28 September 2015.

3. THE DECISION TO INITIATE THE FORMAL INVESTIGATION PROCEDURE

- (46) In its opening decision, the Commission expressed doubts as regards:
- (a) The alleged absence of aid:
 - at the level of ADIF. In this respect, the Commission noted that ADIF is a public undertaking pursuing both economic and non-economic activities, receiving public financing disbursed by the Ministry of Economy and Competitiveness (State resources). Since the aid is granted to ADIF for the purposes of carrying out economic activities (renting out the facilities to third parties, see recital 19 above) and since ADIF is designated as the owner of the infrastructure outside any tendering process, the measure appeared to amount to State aid within the meaning of Article 107(1) of the Treaty in favour of ADIF;
 - at the level of the SPV. While the absence of State aid could be presumed if the tender procedure were to allow for the most economically advantageous offer to match the value of the concession, the tender launched in July 2013 was declared void in October 2013 and no further competitive selection process had been launched. Therefore, the opening decision raised doubts as to the presence of aid at this level ⁽²⁶⁾;
 - at the level of the users of the CEATF centre. Although the infrastructure would be open to all potential users, the absence of a viable business plan led the Commission to raise doubts as to whether the envisaged access prices would effectively reflect market levels.
 - (b) The legality of the aid:
 - Based on the information available at the date of the adoption of its opening decision, the Commission noted that EUR 19,8 million had been spent before the notification of the measure to the Commission, and inquired about the private or public nature of the resources used for the work carried out before the notification of the measure at issue;
 - (c) The compatibility of such financing with the Commission's Framework for State aid for research and development and innovation (the 'R & D&I Framework') ⁽²⁷⁾:
 - the Commission expressed concerns regarding the contribution of the project to a well-defined objective of common interest, its necessity and appropriateness, the incentive effect of the aid and its proportionality. In addition, the Commission indicated that undue negative effects on competition and trade could not be excluded.

4. COMMENTS FROM INTERESTED PARTIES

- (47) As mentioned in recital 5 above, ten companies operating in the railway sector submitted their comments during the formal investigation procedure.
- (48) Firstly, most respondents questioned the existence of demand for a testing facility operating at such high speed (namely above 385 km/h), pointing out that currently the high-speed rail sector in Europe is limited to 320/350 km/h ⁽²⁸⁾. According to a railway operator, a speed of 300 km/h represents an optimal balance between energy consumption and travelling time in terms of market effectiveness.
- (49) From a technical point of view, two companies indicated that high-speed lines are now ballasted tracks that enable rolling stock to circulate at up to 350 km/h. A significant increase in the commercial speed would require the infrastructure to be modified and existing tracks to be replaced by concrete slabs, which would entail prohibitive investment and operating costs. As the exploitation and maintenance costs for commercial railway tracks increase with the rise of the speed, the resulting ticket prices for travellers would make operations uncompetitive in comparison with air transport.

⁽²⁶⁾ See recital 43 of the opening decision.

⁽²⁷⁾ OJ C 198, 27.6.2014, p. 1.

⁽²⁸⁾ Commercial speed up to 350 km/h would require tests to be carried out at maximum speed of 385 km/h.

- (50) Secondly, as regards the testing itself, a rolling stock manufacturer stressed that, even when such facilities allow advanced testing, validation and approval for high-speed rolling stock equipment, infrastructure and superstructure elements, some specific tests can be carried out better directly on commercial railways, that is to say on the real infrastructure. Moreover, another rolling stock manufacturer indicated that the trains produced would be additionally tested on the regular network in the country of destination. Both comments illustrate the absence of demand.
- (51) In addition, a company which provides a testing environment notes that virtual testing through advanced ICT platforms can already be performed and might be a cost-effective solution for future high speed testing, as operating and maintenance costs of the physical testing facilities will be avoided thereby strongly reducing the R & D budgets of railway companies.
- (52) Thirdly, only one company, which also provides testing for material stated that the CEATF would be an opportunity for new development projects. Two other companies indicated that should the test facility be built, they would make use of it.
- (53) One of those two companies stated that it could be a competitive advantage to Spanish rolling stock manufacturers established within the national territory to have a local test centre.
- (54) Fourthly, as regards the building and operating of the test centre, some interested parties emphasised that a clear and robust business case supporting the investment would be needed in order to go forward with such a project. Many of the submissions stressed also the necessity for the test centre, should it be built and become operational, to provide open and non-discriminatory access at market terms.
- (55) Finally, several third parties commented on the geographical location of the CEATF facility. They stress that southern Spain is far from the vast majority of European railway undertakings and rolling stock manufacturers. Such a location bears significant risks and costs as transport of prototype trains is very costly which would inevitably provide an advantage to Spanish rolling stock manufacturers.

5. COMMENTS FROM SPAIN

5.1. Existence of aid

- (56) The Spanish authorities partially reviewed their position as regards the existence of aid, with particular regard to the potential distortion of competition arising from the aid. They indicated that three ranges of speed testing could be distinguished in which the CEATF project may, or may not, compete with other facilities located in the European Union:
- (a) Tests at speeds below 210 km/h: the Spanish authorities confirmed that such tests performed on the CEATF could compete with tests performed at other facilities in Europe. However, they stated that the CEATF centre would not have any advantage in respect of such tests, as the fixed costs for exploitation and maintenance in Antequera would be too high compared to other centres designed to operate at those speeds;
- (b) Tests at speeds between 210 and 385 km/h: the Spanish authorities recognised that there might be competition within this segment between tests performed on the CEATF and tests performed on existing commercial railway tracks. However, the Spanish authorities indicated that those tests represent only a small part of all the tests regarding elements of tracks infrastructure and superstructure, rolling stock and their interactions. Such tests would therefore be limited to certain types of rolling stock tested in 'classical' conditions of use. In addition, as already stated above, the Spanish authorities indicated that the costs of those tests would be too high to be competitive at the CEATF facility;
- (c) Tests at speeds above 385 km/h: the Spanish authorities maintain that, as no market exists for testing at such speeds, the part of the financing corresponding to the construction of the test facility for tests above 385 km/h should not be regarded as aid.

- (57) The Spanish authorities insisted on the fact that the distinction between tests at different speeds should be considered theoretical as, in practice, the possibility to perform tests below 210 km/h or between 210 and 385 km/h at the CEATF would be limited due to high maintenance and operational costs.
- (58) In conclusion, by partially reconsidering its initial position as regards the existence of aid, Spain considers that only the financing of the construction of the elements of the CEATF which allow for testing below 385 km/h should be regarded as State aid and should be assessed in accordance with the R & D&I Framework. In their submission of 2 July 2015, the Spanish authorities provided an evaluation and indicated that those costs represented 25,1 % of the project's costs, and amounted to EUR 90,2 million, excluding VAT. They therefore estimated that the section of the CEATF's facilities dedicated to testing at speeds above 385 km/h, which amounts to EUR 240,6 million, should not be regarded as aid ⁽²⁹⁾.

5.2. Compatibility

- (59) In their observations, the Spanish authorities also reiterate their position on the compatibility of the State aid:
- (a) The CEATF facility would contribute to an objective of common interest as, by increasing R & D&I investments, it would fit in the Smart Growth Operational Programme for Spain, adopted in February 2015 ⁽³⁰⁾, one of the objectives of which is to upgrade R & D&I infrastructures in order to strengthen Spain's capacity to innovate. According to Spain, the country has the most extended high-speed network in Europe and such a test facility could clearly lead to new technological breakthroughs;
- (b) The Spanish authorities justify the need for State aid for this project on the basis of the multidisciplinary nature of the technical tests to be carried out. In their opinion, due to the diverse field of activities of the companies involved in those tests (for example civil works, communication, signalisation, traction, rolling stocks companies) no company would reach the critical mass or have the financial capacity to make an investment comparable to the one needed for the CEATF and which could attract and federate other companies. As regards the financing of the project and existence of a market failure in the form of imperfect and asymmetric information, the Spanish authorities confirmed that no source of financing other than public financing is available for the construction of the CEATF 'taking into account the profitability studies made by ADIF';
- (c) In light of the above, Spain confirmed that the aid measure is appropriate, as there is no other suitable aid instrument than public financing due to the fact that project's cash flows would only cover 8,13 % of the investment (financing deficit would be 91,87 %). The cash flow situation explains also the failure of the first tender to select the SPV as the companies estimated the cash flow insufficient to cover the initial investment;
- (d) According to the Spanish authorities, the aid has an incentive effect. Spain insisted on the fact that, even though the economic analysis of the project reveals a negative Net Present Value ('NPV') of EUR — 362,5 million, it would have, from a socioeconomic point of view, a positive NPV of EUR 17,3 million (taking into account the employment created and other activities induced by the establishment of the CEATF in the region);
- (e) The Spanish authorities indicated that in order to calculate the State aid amount and the maximum aid intensity applicable to the project, only the part of the investment that corresponds to the part of the project that might effectively compete with other facilities should be taken into account (that is to say EUR 90,2 million in their view). As mentioned in recital 58 above, the Spanish authorities consider that this part represents 25,1 % of the total investment. In their view, as the aid intensity allowed for a research infrastructure performing economic activity is 60 %, as set out in point 89 of the R & D&I Framework, ADIF would have to provide only 10 % of the investment ($0,4 \times 25,1 \% = 10 \%$). Despite this, they indicate that ADIF, by providing directly EUR 39,2 million, would ensure a bigger financing, equal to 20 % of the part not covered by the income generated by the project, through a loan given at an interest rate of 1,17 %. Moreover, according to Spain, the tendering and contracting procedures guarantee that the aid is limited to the minimum. Hence they consider the aid to be proportionate and limited to the minimum necessary;

⁽²⁹⁾ As the Spanish authorities admit that there are additional costs which are common to both sections of the CEATF facility and cannot be precisely separated and allocated to each of the sections, those values should not be considered as a precise cost allocation.

⁽³⁰⁾ https://ec.europa.eu/commission/2014-2019/cretu/announcements/new-eu-regional-funds-programme-will-transform-spain-smarter-and-more-competitive-economy_en

- (f) According to Spain, undue negative effects on competition and trade will be avoided, due to the relative competitive disadvantages of CEATF caused by its high operational and maintenance costs for testing at speeds below 210 km/h. As the exploitation and maintenance costs of a high-speed line are multiplied by 3 compared to a normal exploited line, *de facto*, the CEATF would be excluded of the market for such testing;
- (g) Spain guarantees that the aid will comply with all transparency requirements as requested by the applicable Union regulations.
- (60) As indicated in recital 6 above, the comments received from third parties were sent to the Spanish authorities on 24 September 2015. The Spanish authorities observed in their reply dated 14 October 2015 that those comments were very general in nature as regards the perspective of using the CEATF centre, and were based on each company's conception of the evolution of the railway testing market.

6. ASSESSMENT OF THE AID

6.1. Existence of aid

- (61) Article 107(1) of the Treaty states that 'any aid granted by a Member State or through State resources in any form whatsoever which distorts or threatens to distort competition by favouring certain undertakings or the production of certain goods shall, in so far as it affects trade between Member States, be incompatible with the internal market'.
- (62) The Commission will consider whether the funds granted to ADIF on the basis of the agreement of 27 December 2010 as well as the total financing granted for the project on the basis of the decision of the Council of Ministers of 28 June 2013 qualify as aid.
- 6.1.1. *Economic activity*
- (63) The Court of Justice has consistently defined undertakings as entities engaged in an economic activity, regardless of their legal status and the way in which they are financed⁽³¹⁾. The classification of a particular entity as an undertaking thus depends entirely on the nature of its activities.
- (64) The General Court recognised, in 1999, that 'the provision of infrastructures by entities responsible for their management' can constitute an economic activity⁽³²⁾. Thus, it is clear that the construction of infrastructure that is going to be commercially exploited constitutes an economic activity⁽³³⁾.
- (65) In the present case, the construction of the CEATF is directly linked to its exploitation and the Spanish authorities confirmed that the testing activities to be performed on the CEATF are of an economic nature. Those activities indeed involve services that will be offered on the market.
- (66) The Commission considers that the construction and exploitation of the CEATF are therefore economic activities.

6.1.2. State resources

- (67) The project is funded through advance grants and loans from the Ministry of Economy and Competitiveness. Those are State resources.

⁽³¹⁾ Judgment of the Court of Justice of 12 September 2000, *Pavlov and Others*, Joined Cases C-180/98 to C-184/98, ECLI:EU:C:2000:428, paragraph 74; Judgment of the Court of Justice of 10 January 2006, *Cassa di Risparmio di Firenze and Others*, C-222/04, ECLI:EU:C:2006:8, paragraph 107.

⁽³²⁾ Judgment of the General Court of 12 December 2000, *Aéroports de Paris v Commission*, T-128/98, ECLI:EU:T:2000:290, as confirmed on appeal by judgment of the Court of Justice of 24 October 2002 in *Aéroports de Paris v Commission*, C-82/01 P, ECLI:EU:C:2002:617, paragraphs 75 to 80.

⁽³³⁾ See judgment of the Court of Justice of 19 December 2012 in *Mitteldeutsche Flughafen and Flughafen Leipzig-Halle v Commission*, C-288/11 P, ECLI:EU:C:2012:821, paragraphs 43 and 44, and judgment of the Court of Justice of 14 January 2015 in *Eventech*, C-518/13, ECLI:EU:C:2015:9, paragraph 42.

6.1.3. Selective economic advantage

6.1.3.1. In favour of ADIF

- (68) The measure is granted to only one undertaking, ADIF ⁽³⁴⁾, and is therefore selective.
- (69) By contributing to the financing of CEATF through advance grants and loans, the measure gives ADIF an advantage.
- (70) First, the advance grants constitute a direct transfer of State resources to ADIF that clearly constitutes an economic advantage.
- (71) Second, as regards the loans granted to ADIF, it is necessary to determine whether the interest rate corresponds to the market rate.
- (72) The Communication on the revision of the method for setting the reference and discount rates ⁽³⁵⁾ (‘the Communication of 2008’) provides a proxy for the market rates applicable to loans. In their submission of November 2015, the Spanish authorities indicated that they had followed this methodology and applied a margin of 100 points to the applicable rate for Spain. They then made an estimation of the interest saved as a result of the difference between the market rate and the interest rate of the programme, taking into account the specific conditions of each loan (amortisation, duration and grace period). They came to the conclusion that the market rates applicable, for the tranches disbursed under the Innplanta 2010 Programme, are higher than the interest rate applied under the Programme but are lower than market rates applicable for the tranches disbursed under the Innplanta 2011 Programme (3,06 %) ⁽³⁶⁾.
- (73) The margins applied to the rates calculated under the Communication of 2008 depend on the rating of the company and the level of collateral on offer. In this regard, the Commission notes that the rating of ADIF is intrinsically linked to the rating of the Spanish State ⁽³⁷⁾. In addition, the Commission notes that the Spanish authorities did not provide specific information as regards the collateral offered for the loans obtained under the different programmes. It is clear from Table 6 below that at some point in the early half of 2012, ADIF was downgraded from an ‘A’ rating to a ‘B’ rating. The Spanish authorities applied a margin of 100 basis points to all of the loans granted to ADIF. It should be noted that for a company with an ‘A’ rating, such a margin implies a low level of collateral. For a company, whereas for a company with a ‘B’ rating, however, a margin of 100 basis points implies a normal level of collateral (rather than a low level).
- (74) In the course of the formal proceedings, the Commission asked the Spanish authorities to provide information on the loans that ADIF obtained on the market between 20 July 2010 and 20 July 2015 (EIB excluded). The Spanish authorities provided a list of commercial loans granted to ADIF/ADIF Alta velocidad over the past five years, together with their associated conditions ⁽³⁸⁾ (EIB excluded) ⁽³⁹⁾.
- (75) These loans, obtained on the market, provide sufficient information to determine, for each of the years from 2011 to 2014, an appropriate market interest rate.

⁽³⁴⁾ ADIF, as the owner of infrastructure designed to be used for economic activities, is considered as an ‘undertaking’ for State aid purposes. The Spanish authorities did not contest this in the course of the formal investigation.

⁽³⁵⁾ OJ C 14, 19.1.2008, p. 6.

⁽³⁶⁾ The base rate, to which 100 basis point are added as a minimum margin according to the Communication of 2008, was 2,49 % for January 2011, 3,07 % for January 2012, 2,67 % for May 2012, 1,66 % for February 2013 and 1,53 % for January 2014.

⁽³⁷⁾ <https://www.moodys.com/credit-ratings/Administrador-de-Infraestruct-Ferrovias-credit-rating-3010> ADIF’s credit rating has been fixed in relation to the Spanish government’s rating.

⁽³⁸⁾ They listed all the loans obtained by ADIF and ADIF-Alta Velocidad but, with effect from 1 January 2013, the date on which ADIF split into ADIF and ADIF-Alta Velocidad, assets relating to the railway circuit have remained within ADIF. They provided information on date of disposal, expiration date, bank, project to be financed, amount, interest rate for repayment and grace period.

⁽³⁹⁾ See recital 42 above.

Table 6

Details of the calculation of market interest rate to be applied to the loans disbursed to ADIF

Date of the disbursement	Interest rates of the loans disbursed to ADIF (%)	ADIF's credit rating	Communication of 2008		Spanish authorities' suggestion for calculation of the market interest rates (%)	Commercial loans obtained by ADIF	Calculation of the market interest rate based on the commercial loans' terms (%)
			Base rate (%)	Basis points to be added for normal to low collateralisation			
(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)
17.1.2011	1,17	Aa1	1,49	75-100	2,49	For 2011: Euribor 6M (3.1.2011) + 227 bp (average)	1,224 + 2,27 = 3,494
11.1.2012	1,17	Aa2	2,07	75-100	3,07	For 2012: Euribor 6M (2.1.2012) + 352 bp (average)	1,606 + 3,52 = 5,126
2.5.2012	3,06	Baa1	1,67	100-220	2,67	-" (2.5.2012)	0,992 + 3,52 = 4,512
13.2.2013	1,17/3,06	Ba1	0,66	100-220	1,66	For 2013: Euribor 6M (1.2.2013) + 425 bp (average)	0,38 + 4,25 = 4,63
10.1.2014	3,06	Ba1	0,53	100-220	1,53	For 2014: Euribor 6M (2.1.2014) + 215 bp (average)	0,387 + 2,15 = 2,537

(76) It can be observed from Table 6 that the market interest rates based on the commercial loans obtained by ADIF (right-hand column) are consistently higher than the rates suggested by Spain. Since the Communication of 2008 provides only a proxy of market rates, no evidence was provided by Spain to support a conclusion on the level of collateral available, and the consistent evidence in the file shows that the rates that ADIF actually paid on the market were significantly higher, the Commission considers that the latter provide the appropriate benchmark for determining whether the loans in relation to the project confer an advantage on ADIF.

(77) It can be concluded from Table 6 that the interest rates of the loans granted to ADIF in relation to the project are lower than the relevant market interest rates calculated on the basis of the terms of commercial loans obtained by ADIF, except for the loans granted in 2014. Thus, the terms for the various loans granted to ADIF in the period 2011-2013 and amounting to EUR 7 469 500 confer an advantage on ADIF within the meaning of Article 107(1) of the Treaty.

6.1.3.2. In favour of the SPV and future users of the CEATF

- (78) In the opening decision ⁽⁴⁰⁾, the Commission explained that the absence of State aid can only be presumed if the tender procedure allows for the most economically advantageous offer to match the market value of the concession and if the Member State concerned checks that the resulting concession fees are in line with market prices by carrying out a discounted cash flow analysis and a comparison with fees paid for similar services elsewhere ⁽⁴¹⁾. The Commission indicated that, even if certain basic components of the fee structure have been set by Spain *ex ante*, this is not in itself sufficient not to question the open and non-discriminatory character of the process.
- (79) The Commission also considered the possible existence of an indirect advantage at the level of the users of the infrastructure.
- (80) Since the SPV has not been selected due to the failure of the first tender and there are no indications that a second tender will be launched, it is not possible to draw definitive conclusions as to the existence of an advantage at the level of the SPV. Similarly, no firm conclusions as to the existence of aid at the level of the users can be drawn.

6.1.4. Distortion of competition and effect on trade

- (81) When aid granted by a Member State strengthens the position of an undertaking compared with other undertakings competing in intra-Union trade, the latter must be regarded as affected by that aid ⁽⁴²⁾.
- (82) It is clear that the advantages granted to ADIF strengthen the position of that undertaking compared with other undertakings competing in intra-Union trade.
- (83) As indicated in Section 5.1 above, the Spanish authorities recognise that the CEATF may compete with other European facilities for tests below 210 km/h and with existing lines opened to traffic for tests between 210 and 385 km/h. As a consequence, they now consider that only the financing of the construction of CEATF's parts which allow for testing below 385 km/h should be regarded as State aid and should be assessed in accordance with the R & D&I Framework. In this respect, they also claim that the public funding for the latter activities would be limited to EUR 90,2 million.
- (84) The CEATF would compete with other facilities in the European Union that offer high-speed railway testing services, since it is perfectly capable of offering tests at speeds below 385 km/h. Since the evidence suggests that there is very little or no demand for tests at higher speeds (see in detail recitals 48 to 51 above), testing at speeds below 385 km/h is likely to become CEATF's main activity.
- (85) As a result, the State resources granted to ADIF for the construction of the CEATF would be used for subsidising the entry on the market of a new competitor.
- (86) In light of the considerations set out in recitals 82 to 85 above, the aid granted to ADIF is liable to distort competition and affect trade between Member States.

6.1.5. Conclusion on the existence of aid

- (87) The Commission considers that the public resources granted to ADIF for the construction of CEATF on the basis of the Decision of 28 June 2013 and the agreement of 27 December 2010 qualify as State aid within the meaning of Article 107(1) of the Treaty.

⁽⁴⁰⁾ See recitals 43 and 44 of the opening decision.

⁽⁴¹⁾ Case SA.38302 *Investment aid to the port of Salerno*, decision of 27 March 2014, recital 46.

⁽⁴²⁾ Judgment of the Court of Justice of 14 January 2015, *Eventech*, C-518/13, ECLI:EU:C:2015:9, paragraph 66, and judgment of the Court of Justice, *Libert and Others*, C-197/11 and C-203/11, ECLI:EU:C:2013:288, paragraph 77.

6.2. Legality of the aid

- (88) The Spanish authorities notified the measure on the basis of Article 108(3) of the Treaty on 20 September 2013. They have also indicated that the railway circuit will not be constructed until it is approved by the Commission ⁽⁴³⁾.
- (89) Spain granted the aid on the basis of the agreement of 27 December 2010 and the Decision of the Council of Ministers of 28 June 2013. Part of that aid has already been paid out, as described in recital 44 above.
- (90) Since the aid was granted before being approved by the Commission, it must be considered as unlawful aid within the meaning of Article 1(f) of Council Regulation (EU) 2015/1589 ⁽⁴⁴⁾.

6.3. Compatibility

- (91) Having established that the measure involves State aid within the meaning of Article 107(1) of the Treaty, the Commission now has to assess whether it can be found compatible with the internal market.
- (92) The Court of Justice has held that ‘where the Commission decides to initiate a formal investigation procedure, it is for the Member State and the potential beneficiary of new aid to provide the Commission with evidence capable of showing that the aid is compatible with the common market’ ⁽⁴⁵⁾. As set out further below, the Spanish authorities and the beneficiary ADIF did not provide convincing evidence to this effect neither in the notification and following submissions, nor in their comments to the opening decision and in the submissions provided during the formal investigation phase.
- (93) The Spanish authorities indicated that the public funding of CEATF, to the extent that such funding constitutes aid within the meaning of Article 107(1) of the Treaty, should be declared compatible with the internal market in view of its overall R & D&I objective and in light of the rules of the R & D&I Framework applicable to R & D&I infrastructures ⁽⁴⁶⁾.
- (94) It follows from the conclusion in Section 6.2 above that the aid is unlawful. Point 126 of the R & D&I Framework states that ‘unlawful R & D&I aid will be assessed in accordance with the rules applicable at the date on which the aid was awarded’.
- (95) At the time of the grant of the aid, the 2006 R & D&I Framework was in force ⁽⁴⁷⁾.
- (96) The 2006 R & D&I Framework does not contain specific provisions as regards aid to research infrastructures. Consequently the Commission considers that the assessment of the aid measure should be based directly on Article 107(3)(c) of the Treaty. That provision states that ‘aid to facilitate the development of certain economic activities or of certain economic areas, where such aid does not adversely affect trading conditions to an extent contrary to the common interest’ may be considered to be compatible with the internal market.

⁽⁴³⁾ See submission of Spanish authorities of 6 February 2014, answer to question 7, provided by the Spanish ministry of finance and public administration, page 13.

⁽⁴⁴⁾ Council Regulation (EU) 2015/1589 of 13 July 2015 laying down detailed rules for the application of Article 108 of the Treaty on the Functioning of the European Union (OJ L 248, 24.9.2015, p. 9).

⁽⁴⁵⁾ Judgment of the Court of Justice of 16 December 2010, *AceaElectrabel Produzione v Commission*, C-480/09 P, ECLI:EU:C:2010:787, paragraph 99 and the case law cited therein.

⁽⁴⁶⁾ According to point 15(ff) of the R & D&I Framework “‘research infrastructure’ means facilities, resources and related services that are used by the scientific community to conduct research in their respective fields and covers scientific equipment or set of instruments, knowledge-based resources such as collections, archives or structured scientific information, enabling information and communication technology-based infrastructures such as grid, computing, software and communication, or any other entity of a unique nature essential to conduct research. Such infrastructures may be “single-sited” or “distributed” (an organised network of resources)’.

⁽⁴⁷⁾ Community Framework for State aid for research and development and innovation (OJ C 323, 30.12.2006, p. 1).

- (97) The Commission, in order to determine the compatibility of a measure under Article 107(3)(c) of the Treaty, performs a balancing test, weighing positive effects in terms of a contribution to the achievement of well-defined objectives of common interest and negative effects on trade and competition in the common market. In this regard, the Commission will consider the following principles ⁽⁴⁸⁾:
- (a) contribution to a well-defined objective of common interest: a State aid measure must aim at an objective of common interest in accordance with Article 107(3) of the Treaty;
 - (b) need for State intervention: a State aid measure must be targeted towards a situation where aid can bring about a material improvement that the market cannot deliver itself, for example by remedying a market failure or addressing an equity or cohesion concern;
 - (c) appropriateness of the aid measure: the proposed aid measure must be an appropriate policy instrument to address the objective of common interest;
 - (d) incentive effect: the aid must change the behaviour of the undertaking(s) concerned in such a way that it engages in additional activity, which it would not carry out without the aid or would carry out in a restricted or different manner or location;
 - (e) proportionality of the aid: the amount and intensity of the aid must be limited to the minimum needed to induce the additional investment or activity by the undertaking(s) concerned;
 - (f) avoidance of undue negative effects on competition and trade between Member States: the negative effects of aid must be sufficiently limited, so that the overall balance of the measure is positive;
 - (g) transparency of aid: Member States, the Commission, economic operators, and the public, must have easy access to all relevant acts and to pertinent information about the aid awarded thereunder.

6.3.1. Contribution to a well-defined objective of common interest

- (98) The Spanish authorities emphasised in their notification and in the response to the opening decision (see recital 59 of the opening decision and Section 5.2 above) that the project contributes to increased R & D&I investment in Spain, which is one of the objectives of common interest of the EU 2020 Strategy, and fits into the Smart Growth Operational Programme for Spain, adopted in February 2015. They claim that the CEATF is a scientific and technical infrastructure which will allow multidisciplinary technical aspects to be tested in the rail sector. The Spanish authorities also claim that the investment in the CEATF will strengthen the economic development of a region, Andalucía, which faces a high unemployment rate.
- (99) First, such claims, should be assessed in view of the demand for such a research facility and in view of the R & D&I activities which could be carried out therein.
- (100) As detailed in recitals 60 to 62 of the opening decision, the Commission questioned the existence of demand from rolling stock and railway equipment manufacturers for this specific research infrastructure. In particular, the Commission referred to the failure of the first tender for the construction and operation of CEATF, as well as to the high costs of construction and operation of railway networks, designed to provide commercial transport services at speeds above 350 km/h, which would not be economically viable in the present market conditions and in the foreseeable future ⁽⁴⁹⁾.

⁽⁴⁸⁾ For example, SA 32835 (2011/N) — Northwest Urban Investment Fund (JESSICA) (OJ C 281, 24.9.2011, p. 2), http://ec.europa.eu/competition/state_aid/cases/240234/240234_1247477_97_2.pdf and SA 38769 (2015/N) — Green Deal for Electric Vehicle Charging Infrastructure, to be published, http://ec.europa.eu/competition/state_aid/cases/258489/258489_1710979_137_2.pdf

⁽⁴⁹⁾ With respect to the argument brought up by the Spanish authorities recalling that a questionnaire was sent out to more than 80 companies, out of which 47 replied and 26 indicated they would be ready to take part of the project's risks, it should be observed that the latter were mostly companies from the construction sector whose business interest is linked to the construction phase of the project, but not to the R & D&I activities to be performed therein. Moreover, none of them confirmed their real interest by ultimately submitting an offer in the tender organised in 2013, which was declared void due to the lack of participants.

- (101) The comments received from third parties in response to the opening decision confirm the Commission's position that a research infrastructure dedicated to very high speed train tests (testing performed above 385 km/h for commercial transport services provided at speed above 350 km/h) is not needed by the market.
- (102) No rolling stock producers envisage developing products running at such very high speeds due to the lack of market demand for the commercial operation of such trains. Some railway operators point out the market effectiveness arguments (balance between energy consumption and travelling time) which cap the commercial exploitation of high-speed trains in Europe at much lower speeds (average in Europe — 280-300 km/h, maximum — 320-350 km/h), as well as the exponential increase of the infrastructure's investment, exploitation and maintenance costs for speeds above 300 km/h, which would make the train tickets' prices uncompetitive compared to airplane tickets. No evidence suggests that there is market demand for the construction of new commercial railway lines and/or for the upgrading of the existing tracks for the purposes of providing transport services at speeds exceeding 320-350 km/h — and therefore for a rail testing facility specifically dedicated to speeds exceeding such limits ⁽⁵⁰⁾.
- (103) Additional specific arguments for the lack of demand for CEATF infrastructure stem from its geographical location, which, according to some of the respondents, will induce significant time and transportation expenses.
- (104) Finally, the arguments regarding the availability of more advanced and cost effective solutions for a possible future high speed testing, such as virtual testing through ICT based solutions also run against the necessity of a dedicated physical testing facility.
- (105) Therefore, the claim that the notified aid would have induced additional R & D&I activities in the railway sector through the construction of an infrastructure for high speed testing facility is contradicted by the information collected by the Commission.
- (106) Second, other policy-related objectives, invoked by the Spanish authorities, notably the socioeconomic benefits resulting from the creation of new jobs in the region of Antequera ⁽⁵¹⁾ are not relevant for the assessment of the contribution of the notified aid to an objective of common interest in the R & D&I field. Although the Spanish authorities claim that, considered from a socioeconomic perspective, the CEATF project would achieve a positive NPV of EUR 17,3 million, they have not provided any convincing evidence of benefits that would be of such a magnitude so as to offset the construction costs and the operating losses that the planned infrastructure would generate during its whole period of operation. The claimed benefits seem to be limited to the creation of jobs in the construction sector during the construction phase of the infrastructure. This means that, far from contributing to a long-term objective of promoting a sustainable development of the Andalucía region, the project would only have short-term, transitory effects on the local economy ⁽⁵²⁾.
- (107) In light of the considerations set out in recitals 98 to 106 above, the Commission considers that Spain did not provide sufficient evidence in order to prove that the project contributes to a well-defined objective of common interest.

6.3.2. Need for State intervention

- (108) The Spanish authorities justify the need for State aid to this project by the multidisciplinary nature of the technical tests to be carried out. According to them, due to the diverse fields of activities of the companies

⁽⁵⁰⁾ It is not surprising that the only company that expressed favourably in support of the project is a Spanish company which, as confirmed by other respondents' comments, could *de facto* enjoy a preferential access to the facility due to its proximity to the location of the centre. Its comment seems therefore to be inspired by the possibility to gain competitive advantage rather than by objective evaluation of the necessity of the facility.

⁽⁵¹⁾ See also footnote 17 in the opening decision.

⁽⁵²⁾ For example, the Guidelines on regional State aid for 2014-2020 (OJ C 209, 23.7.2013, p. 1), which specifically envisage job creation, place that objective in the wider context of delivering inclusive and sustainable growth (emphasis added). Indeed, even when the Commission had specific guidelines on aid for job creation (Guidelines on aid to employment, OJ C 334, 12.12.1995, p. 4), it was acknowledged that aid to create jobs that is limited to one or more sensitive sectors experiencing overcapacity or in crisis is also generally viewed less favourably with the result that its adverse effects on employment in competing sectors in other Member States generally outweighed the common interest involved in active measures to reduce unemployment (see point 23).

potentially involved in those tests (for example civil works, communication, signalisation, traction, and rolling stock companies) no company would reach, on a stand-alone basis, the critical mass or have the financial capacity to make an investment as large as the one needed for the CEATF or could attract and federate other companies into such investment. As regards the financing of the project, the Spanish authorities stated that no source of financing other than public financing is available for the construction of the CEATF 'taking into account the profitability studies made by ADIF'.

- (109) The argument raised by the Spanish authorities points to an alleged market failure in the form of a coordination problem for the financing of the construction of the envisaged facility. It seems to assume that, since no individual company would have an incentive to embark upon the financing of the project due to the imbalance between its costs and the expected benefits (at the level of the individual firm), the only possible way to sustain the investment would be through the creation of a consortium gathering various companies operating in different technical fields which could ensure the full exploitation of the facility's potential through a joint use.
- (110) However, nothing in the file suggests that companies potentially interested to enter into such a collaboration would have been prevented from doing so due to objective difficulties hindering effective collaboration amongst them. Quite to the contrary, the fact that the Spanish government intervened in order to facilitate the creation of a Special Purpose Vehicle (SPV) via the organisation of an open tender and that such tender process failed suggests instead that the real problem affecting the financing of the notified project lay elsewhere, namely in its lack of financial viability. The weakness of the argument put forward by the Spanish authorities is confirmed by the fact that, even when the Spanish government decided to proceed with the allocation of public funding to ADIF to start the works, no private independent investor showed an interest in participating in the funding.
- (111) The Commission therefore concludes that Spain has not provided sufficient evidence of the existence of a market failure in the form of a coordination failure at the level of the financing of the CEATF.
- (112) In addition, it should be noted that the Commission's decisional practice in the R & D&I field refers to three types of specific market failure: imperfect and asymmetric information, coordination and network failures for R & D&I activities and knowledge spillovers. However, the Spanish authorities have not shown that any of these specific market failures occurs in the present case.
- (113) Concerning the difficulties affecting the financing of the CEATF project, no evidence was provided that the private sector would be deterred from financing the project due to a possible lack of or asymmetry of information specifically linked to identifiable and risky R & D&I activities. As to coordination and network failures in R & D&I, it is clear from the Spanish authorities' statements that no cooperation was planned between ADIF and the industry in the test centre. It seems that the aid aims at attracting companies in participating either in the design or in the use of the CEATF infrastructure but does not trigger specific cooperation between them in order to perform collaborative R & D&I activities in the centre. Finally, Spain has provided no elements proving the existence of knowledge spill-overs benefitting third parties that might arise from the CEATF project.
- (114) Spain has provided no other arguments in support of a conclusion that the aid can bring about a material improvement that the market cannot deliver itself.
- (115) In light of the considerations set out in recitals 108 to 113 above, the Commission concludes that the need for State intervention has not been proved.

6.3.3. *Appropriateness of the aid measure*

- (116) Member States can make different choices with regard to policy instruments and State aid control does not impose a single way to intervene in the economy. However, State aid under Article 107(1) of the Treaty can only be justified by the appropriateness of a particular instrument to meet the public policy objective and contribute to one or more of the common interest objectives⁽³³⁾.

⁽³³⁾ See for a discussion of appropriateness Cases C 25/2004 — DVB-T Berlin-Brandenburg (OJ L 200, 22.7.2006, p. 14) or N 854/06 — Soutien de l'agence de l'innovation industrielle en faveur du programme mobilisateur pour l'innovation industrielle TVMSL (OJ C 182, 4.8.2007, p. 5).

- (117) The Commission normally considers that a measure is an appropriate instrument where the Member State has considered whether alternative policy options exist which are equally suitable to achieve the common interest objective but at the same time less distortive to competition than the selective State aid and where it can demonstrate the appropriateness of the measure in targeting efficiency and/or equity objectives.
- (118) The Spanish authorities did not provide any information as regards possible alternative policy instruments or other aid instruments to finance the project. In response to the concerns expressed in the opening decision, they confined themselves to stating that, in light of the alleged financing deficit of 91,87 % of the project, no instrument other than public financing would be appropriate in this case.
- (119) The Commission observes that the fact that the notified project remains vastly loss making even when aided is not sufficient to demonstrate that State aid is an appropriate instrument.
- (120) Moreover, as it has not been demonstrated that the project contributes to the objective of common interest of increasing R & D&I activities, the appropriateness of the investment instrument chosen by the Spanish government has also not been proved. Other measures that would actually bring about increased R & D&I activities would be more appropriate instruments to meet that objective of common interest.
- (121) Similar considerations apply in relation to the other objectives of common interest invoked by Spain. As noted above in recital 106, new jobs would be mainly limited to the construction sector and temporary in nature. State aid for the construction of infrastructure that is unlikely to be used is not an appropriate policy instrument to create growth and jobs.

6.3.4. *Incentive effect*

- (122) State aid must have an incentive effect. The required incentive effect is present if the aid changes the behaviour of the beneficiary in relation to reaching the objective of common interest and addressing the identified market failure.
- (123) The Spanish authorities indicated that without the aid, the CEATF would not be built: they argue that the aid has an incentive effect since the project would never be realised without the aid.
- (124) However, in the present case, the Commission notes that the aid enables the construction of a railway testing facility that is being put at the disposal of ADIF, as future owner, but does not seem to trigger any change in the behaviour of ADIF or others in terms of additional R & D&I activities to be performed at the testing facility.
- (125) In the course of the formal investigation procedure, the Spanish authorities did not provide any new information or argumentation regarding the change of behaviour of ADIF due to the aid. While the available data indicate that the notified project will remain loss-making even with aid, the Spanish authorities have failed to demonstrate that it would nevertheless generate important R & D&I-related benefits for society. On the contrary, the comments received from potential users of the infrastructure during the formal investigation suggest that, as currently designed, the project does not match unfulfilled requirements on the demand side from companies engaged in R & D&I activities within the railway sector.
- (126) No grounds have been brought forward that would justify that the Commission deviate from its initial assessment, as expressed in the opening decision. In essence, far from creating an incentive effect, the aid targets the construction of an infrastructure whose added value compared to existing alternatives (namely test-runs on the regular railways networks) has not been demonstrated.

6.3.5. *Proportionality of the aid*

- (127) The Commission considers that the aid is proportionate if the same result could not be achieved with less aid.

- (128) The Spanish authorities notified the project as being in line with the R & D&I Framework, which indicates that the maximum aid intensity allowed for covering investments in research infrastructures used for economic purposes is limited to the net extra costs up to a cap of 60 % of the eligible costs (point 89 of the R & D&I Framework). In the present case, the public support will cover 100 % of the costs.
- (129) Due to the absence or the insufficiency of private investments in the CEATF infrastructure, the aid at issue does not seem to be proportionate.

6.3.6. *Avoidance of undue negative effects on competition and trade between Member States*

- (130) Article 107(3)(c) of the Treaty requires that the positive developments generated as a result of a given measure be balanced with its negative effects on trade and competition.
- (131) The Commission considers that the Spanish authorities have not proven the existence of positive effects induced by the present measure. The Commission consequently concludes that the construction of the CEATF will fail to achieve its objective to increase R & D in the specific field of very high-speed rail transport services as market demand for such infrastructure and related R & D services is weak at best or non-existent. The Commission also concluded that there is no demonstrated market failure nor proof that the measure contributes to a meaningful change of behaviour of the beneficiary.
- (132) As to the other positive effects of the measure on which Spain relies, the Commission considers that the temporary creation of jobs, mainly in the construction sector, comes at a very high cost and carries limited positive value.
- (133) In addition, as the measure allows the entrance on the market of a new competitor through the use of massive public financing, the Commission considers that it will have a negative effect on competition. The aid would call into question previous investments made by competitors at their testing facilities as well as reducing future investments in maintenance or improvement of such infrastructures.
- (134) The market impacted by the aid is the market for services for railway equipment testing in the European Union. On this market, as already pointed out in the opening decision, three railway test centres are currently in operation in the European Union: Cerhenice (Velim) in Czech Republic, Wildenrath in Germany and Valenciennes in France, on which testing up to speeds of 210 km/h is performed. Testing of high-speed rolling stock is carried out on lines in commercial use ⁽⁵⁴⁾ that have a maximum design speed of 350 km/h, with tests being carried out at up to 385 km/h as required by the standard (10 % over the nominal speed of the train).
- (135) It follows that there is not a perfect substitutability between the testing services of CEATF on the one hand and other test facilities and tests on commercial networks on the other hand due to the different maximum testing speeds. However, the already existing possibility of testing at speeds up to 385 km/h on commercial networks captures the actual and potential demand for testing services up to this commercially viable speed. As regards the future potential demand for testing at speeds up to 520 km/h, the information available and the comments received from the market participants suggest that this is not going to be a commercially viable option, at least in the foreseeable future. Therefore, the CEATF testing facility will be a direct competitor to both those existing facilities and the public rail networks as well. The Commission therefore considers that the measure is designed to subsidise the entry on the market of a new competitor entirely through State resources and is liable to significantly distort competition on that market as a result.
- (136) The competition on the downstream markets of railway products to be tested (including rolling stock and equipment) could also be negatively affected by this aid measure. As pointed out in the comments received on the opening decision, the geographical location of the facility may create *de facto* competition advantages in favour of the national rolling stock producers which would be more likely to use CEATF for testing, without incurring significant transport costs

⁽⁵⁴⁾ For example — Rete Feroviaria Italiana in Italy, SNCF in France, DB Bahn in Germany.

- (137) Having regard to the lack of sufficiently proven positive effects of the notified aid, as observed by the Commission in Sections 6.3.1 to 6.3.5, the negative effects of the measure in terms of actual and potential distortion of competition are considered such as to outweigh its claimed efficiencies.

6.3.7. *Transparency of aid*

- (138) In the light of the previous considerations it is not necessary to consider to what extent the aid is transparent.

6.3.8. *Conclusions on compatibility of the aid*

- (139) In light of the considerations set out in Sections 6.3.1 to 6.3.7 above, the Commission concludes that the notified aid measure cannot be declared compatible with the internal market on the basis of Article 107(3)(c) of the Treaty.

6.4. **Recovery of the incompatible aid**

- (140) In line with well-settled case-law, Article 16(1) of Regulation (EU) 2015/1589 states that ‘where negative decisions are taken in cases of unlawful aid, the Commission shall decide that the Member State concerned shall take all necessary measures to recover the aid from the beneficiary (...)’.
- (141) The Courts of the Union have also consistently held that the obligation on a Member State to abolish aid regarded by the Commission as being incompatible with the internal market is designed to re-establish the previously existing situation⁽⁵⁵⁾. In this context, the Courts of the Union have established that this objective is attained once the recipient has repaid the amounts granted by way of unlawful aid (including interest), thus forfeiting the advantage which it had enjoyed over its competitors on the market, and the situation prior to the payment of the aid is restored⁽⁵⁶⁾.
- (142) The Commission has concluded that the aid granted by Spain to ADIF is unlawful and is incompatible with the internal market. As a result, the aid must be recovered in order to re-establish the situation that existed on the market prior to its granting. Recovery should cover the time from when the advantage accrued to the beneficiaries, that is to say when the aid was put at the disposal of the beneficiaries and the sums to be recovered should bear interest until effective recovery.
- (143) On the basis of the information provided by Spain and summarised in recitals 43 and 44, and in Tables 3, 4 and 5 above, the total of the funds disbursed to ADIF in the period 2011-2014 amounts to EUR 143 703 000 (including EUR 135 866 000 in grants and EUR 7 837 000 in loans).
- (144) The Commission has calculated the interest rate that would have been available on the market on the basis of the information provided by Spain concerning the commercial loans actually contracted by ADIF in the relevant period. However, the Commission appreciates that the result of its calculation could be affected by the existence of other loans of which it has not been made aware. Thus, for the purposes of calculating the difference between the interest rates actually fixed in the loans granted to ADIF and the market interest rate, and therefore the aid element that is to be recovered, Spain has a period of two months from the date of the adoption of this decision within which it may provide the Commission with evidence of any other commercial loans contracted by ADIF in the relevant period.
- (145) Spain must therefore recover from ADIF both the advance grants actually disbursed and not yet reimbursed by ADIF and the aid element contained in the loans granted in 2011, 2012 and 2013, which, without prejudice to the possibility referred to in the preceding paragraph, is the difference between the interest rate of the loan and the market interest rate indicated in Table 6 above (see recital 75 above). The total amount to be recovered shall include recovery interest as of the moment that each grant or loan was disbursed and until the moment of its reimbursement.

⁽⁵⁵⁾ See, inter alia, judgment of the Court of Justice of 14 September 1994, *Spain v Commission*, C-278/92, C-279/92 and C-280/92, ECLI:EU:C:1994:325, paragraph 75.

⁽⁵⁶⁾ See, inter alia, judgment of the Court of Justice of 17 June 1999, *Belgium v Commission*, Case C-75/97, ECLI:EU:C:1999:311, paragraphs 64 and 65.

- (146) While for the grants the recovery interest should be calculated on the basis of the principal of the grant, the recovery interest for the loans should be calculated on the basis of the aid element contained in the loans.
- (147) No new payments should be made by Spain in relation to the project at hand.
- (148) As indicated in recital 88 above, the Spanish authorities stated that the CEATF railway circuit would not be constructed without approval of the Commission. In view of this, the Commission considers that there should be no reason for ADIF to keep the loans given that they were granted solely for this specific project. For this reason, the Commission requests the immediate termination and repayment of the loans granted to ADIF.

7. CONCLUSION

- (149) The advance grants and loans provided to ADIF by Spain constitute aid within the meaning of Article 107(1) of the Treaty. That aid was granted by Spain in violation of the notification and standstill obligations in Article 108(3) of the Treaty.
- (150) The Commission has concluded that the aid is incompatible with the internal market.
- (151) Therefore, the aid should be recovered from the beneficiary, ADIF, together with recovery interest,

HAS ADOPTED THIS DECISION:

Article 1

The public financing granted by Spain to Administrador de Infraestructura ferroviaria (ADIF) on the basis of the agreement of 27 December 2010 and the Decision of the Council of Ministers of 28 June 2013 for the construction of the CEATF, in the form of loans at rates that are below market interest rates and grants, amounting to EUR 358 552 309, constitutes State aid within the meaning of Article 107(1) of the Treaty.

Article 2

The aid referred to in Article 1 is unlawful as it was granted in breach of the notification and standstill obligations stemming from Article 108(3) of the Treaty.

Article 3

The aid referred to in Article 1 is incompatible with the internal market.

Article 4

1. In so far as the aid referred to in Article 1 has been disbursed to ADIF, Spain shall recover it immediately.
2. The sums to be recovered shall bear interest from the date on which they were put at the disposal of ADIF until their actual recovery.
3. The interest shall be calculated on a compound basis in accordance with Chapter V of Commission Regulation (EC) No 794/2004⁽⁵⁷⁾. The amounts to be repaid shall bear interest from the date on which they were made available to the beneficiaries, that is to say from the date of payment of the grant and loans instalments, until actual recovery.
4. Spain shall cancel all outstanding payments of the aid referred to in Article 1 with effect from the date of adoption of this Decision.
5. Spain shall request the termination and repayment of the loans granted to ADIF.

⁽⁵⁷⁾ Commission Regulation (EC) No 794/2004 of 21 April 2004 implementing Council Regulation (EU) 2015/1589 laying down detailed rules for the application of Article 108 of the Treaty on the Functioning of the European Union (OJ L 140, 30.4.2004, p. 1).

Article 5

Spain shall ensure that this decision is implemented within four months of the date of notification of this Decision.

Article 6

1. Within two months of the date of notification of this Decision, Spain shall submit the following information to the Commission:

- (a) the total amount (principal and recovery interests) to be recovered from ADIF;
- (b) a detailed description of the measures already taken and planned to comply with this Decision;
- (c) documents demonstrating that ADIF has been ordered to repay the aid.

2. Spain shall keep the Commission informed of the progress of the national measures taken to implement this Decision until recovery of the aid referred to in Article 1 has been completed. It shall immediately submit, on simple request by the Commission, information on the measures already taken and planned to comply with this Decision. It shall also provide detailed information concerning the amounts of aid and recovery interest already recovered from ADIF.

Article 7

This Decision is addressed to the Kingdom of Spain.

Done at Brussels, 25 July 2016.

For the Commission
Margrethe VESTAGER
Member of the Commission

ACTS ADOPTED BY BODIES CREATED BY INTERNATIONAL AGREEMENTS

Only the original UN/ECE texts have legal effect under international public law. The status and date of entry into force of this Regulation should be checked in the latest version of the UN/ECE status document TRANS/WP.29/343, available at:

<http://www.unece.org/trans/main/wp29/wp29wgs/wp29gen/wp29fdocstts.html>

Regulation No 138 of the Economic Commission for Europe of the United Nations (UNECE) — Uniform provisions concerning the approval of Quiet Road Transport Vehicles with regard to their reduced audibility [2017/71]

Date of entry into force: 5 October 2016

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1. SCOPE

This Regulation applies to electrified vehicles of categories M and N which can travel in the normal mode, in reverse or at least one forward drive gear, without an internal combustion engine operating ⁽¹⁾ in respect to their audibility.

⁽¹⁾ At this stage, only acoustic measures shall be developed in order to overcome the concern of reduced audible signals from electrified vehicles. After finalisation, the appropriate GR shall be assigned with the enhancement of the Regulation in order to develop alternative, non-acoustic measures, taking into account active safety systems such as, but not limited to, pedestrian detection systems. To provide for environmental protection, this Regulation specifies also maximum limits.

2. DEFINITIONS

For the purpose of this Regulation,

- 2.1. 'Approval of a vehicle' means the approval of a vehicle type with regard to sound;
- 2.2. 'Acoustic Vehicle Alerting System' (AVAS) means a component or set of components installed in vehicles with the primary purpose to fulfil the requirements of this Regulation;
- 2.3. 'Vehicle type' means a category of motor vehicles which does not differ essentially in such respects as:
 - 2.3.1. The shape and the materials of the bodywork of the vehicle which affect the sound level emitted.
 - 2.3.2. The principle of the powertrain (from the batteries to the wheels). Notwithstanding the provisions of 2.3.2 vehicles which differ with respect to overall gear ratios, battery type or the fitment of a range extender may be considered vehicles of the same type;
 - 2.3.3. If applicable, the number and type(s) of sound emitting devices (hardware) of AVAS fitted on the vehicle;
 - 2.3.4. If applicable, the position of the AVAS on the vehicle.
- 2.4. 'Frequency Shift' means the variation of the frequency content of the AVAS sound as a function of the vehicle speed.
- 2.5. 'Electrified vehicle' means a vehicle with a powertrain containing at least one electric motor or electric motor-generator.
 - 2.5.1. 'Pure Electric Vehicle' (PEV) means a motor vehicle with an electric motor as its sole mean of propulsion.
 - 2.5.2. 'Hybrid Electric Vehicle' (HEV) means a vehicle with a powertrain containing at least one electric motor or electric motor generator and at least one internal combustion engine as propulsion energy converters.
 - 2.5.3. 'Fuel Cell vehicle' (FCV) means a vehicle with a fuel cell and an electric machine as propulsion energy converters.
 - 2.5.4. 'Fuel Cell Hybrid Vehicle' (FCHV) means a vehicle with at least one fuel storage system and at least one Rechargeable Electric Energy Storage System (REESS) as propulsion energy storage system.
- 2.6. 'Mass in running order' means the mass of the vehicle, with its fuel tank(s) filled to at least 90 % of its or their capacity/ies, including the mass of the driver (75 kg), of the fuel and liquids, fitted with the standard equipment in accordance with the manufacturer's specifications and, when they are fitted, the mass of the bodywork, the cabin, the coupling and the spare wheel(s) as well as the tools.
- 2.7. 'Pause function' means a mechanism to halt temporarily the operation of an AVAS.
- 2.8. 'Front plane of the vehicle' means a vertical plane tangent to the leading edge of the vehicle.
- 2.9. 'Rear plane of the vehicle' means a vertical plane tangent to the trailing edge of the vehicle.
- 2.10. Symbols and abbreviated terms and the paragraph in which they are first used.

Table 1

Symbols and Abbreviations

Symbol	Unit	Paragraph	Explanation
ICE	—	6.2	Internal Combustion Engine
AA'	—	Annex 3 para. 3	Line perpendicular to vehicle travel which indicates the beginning of the zone to record sound pressure level during test
BB'	—	Annex 3 para. 3	Line perpendicular to vehicle travel which indicates end of the zone to record sound pressure level during test
PP'	—	Annex 3 para. 3	Line perpendicular to vehicle travel which indicates location of microphones
CC'	—	Annex 3 para. 3	Centreline of vehicle travel
v_{test}	km/h	Annex 3 para. 3	Target vehicle test velocity
j	—	Annex 3 para. 3	Index for single test run within standstill or constant speed test conditions
L_{reverse}	dB(A)	Annex 3 para. 3	Vehicle A-weighted sound pressure level for reversing test
$L_{\text{crs},10}$	dB(A)	Annex 3 para. 3	Vehicle A-weighted sound pressure level for constant speed test at 10 km/h.
$L_{\text{crs},20}$	dB(A)	Annex 3 para. 3	Vehicle A-weighted sound pressure level for constant speed test at 20 km/h.
L_{corr}	dB(A)	Annex 3 para. 2.3.2	Background noise correction
$L_{\text{test},j}$	dB(A)	Annex 3 para. 2.3.2	A-weighted sound pressure level result of j^{th} test run
$L_{\text{testcorr},j}$	dB(A)	Annex 3 para. 2.3.2	A-weighted sound pressure level result of j^{th} test run corrected for background noise
L_{bgn}	dB(A)	Annex 3 para. 2.3.1	Background A-weighted sound pressure level.
$\Delta L_{\text{bgn}, p-p}$	dB(A)	Annex 3 para. 2.3.2	Range of maximum to minimum value of the representative background noise A-weighted sound pressure level over a defined time period.
ΔL	dB(A)	Annex 3 para. 2.3.2	A-weighted sound pressure level of j^{th} test result minus the A-weighted background noise level ($\Delta L = L_{\text{test},j} - L_{\text{bgn}}$)
v_{ref}	km/h	Annex 3 para. 4	Reference vehicle velocity used for calculating frequency shift percentage.

Symbol	Unit	Paragraph	Explanation
$f_{j, \text{speed}}$	Hz	Annex 3 para. 4	Single frequency component at a given vehicle speed per sample segment, e.g. $f_{1,5}$
f_{ref}	Hz	Annex 3 para. 4	Single frequency component at reference vehicle speed
f_{speed}	Hz	Annex 3 para. 4	Single frequency component at a given vehicle speed, e.g. f_5
l_{veh}	m	Annex 3, Appendix	Length of vehicle

3. APPLICATION FOR APPROVAL

- 3.1. The application for approval of a vehicle type with regard to reduced audibility shall be submitted by its manufacturer or by a duly accredited representative.
- 3.2. It shall be accompanied by the undermentioned documents and the following particulars:
 - 3.2.1. A description of the vehicle type with regard to the items mentioned in paragraph 2.3 above;
 - 3.2.2. A description of the engine(s) as mentioned in Annex 1, Addendum;
 - 3.2.3. If applicable, a list of the components constituting the AVAS;
 - 3.2.4. If applicable, a drawing of the assembled AVAS and an indication of its position on the vehicle.
- 3.3. In the case of paragraph 2.3, the single vehicle, representative of the type in question, will be selected by the Technical Service conducting approval tests, in accordance with the vehicle manufacturer.
- 3.4. The Type Approval Authority shall verify the existence of satisfactory arrangements for ensuring effective control of the conformity of production before type approval is granted.

4. MARKINGS

- 4.1. The components of the AVAS (if applicable) shall bear:
 - 4.1.1. The trade name or mark of the manufacturer(s) of the AVAS components;
 - 4.1.2. A designated identification number(s).
- 4.2. These markings shall be clearly legible and be indelible.

5. APPROVAL

- 5.1. Type approval shall only be granted if the vehicle type meets the requirements of paragraphs 6 and 7 below.
- 5.2. An approval number shall be assigned to each type approved. Its first two digits (at present 00 corresponding to the 00 series of amendments) shall indicate the series of amendments incorporating the most recent major technical amendments made to the Regulation at the time of issue of the approval. The same Contracting Party shall not assign the same number to another vehicle type.
- 5.3. Notice of approval or of extension or of refusal or withdrawal of approval or of production definitively discontinued of a vehicle type pursuant to this Regulation shall be communicated to the Parties to the Agreement applying this Regulation by means of a form conforming to the model in Annex 1 to this Regulation.

- 5.4. There shall be affixed to every vehicle conforming to a vehicle type approved under this Regulation, conspicuously and in a readily accessible place specified on the approval form, an international approval mark consisting of:
- 5.4.1. A circle surrounding the letter 'E' followed by the distinguishing number of the country which has granted approval;
- 5.4.2. The number of this Regulation, followed by the letter 'R', a dash and the approval number to the right of the circle prescribed in paragraph 5.4.1.
- 5.5. If the vehicle conforms to a vehicle type approved, under one or more other Regulations annexed to the Agreement, in the country which has granted approval under this Regulation, the symbol prescribed in paragraph 5.4.1 need not be repeated. In such a case the regulation and approval numbers and the additional symbols of all the Regulations under which approval has been granted in the country which has granted approval under this Regulation shall be placed in vertical columns to the right of the symbol prescribed in paragraph 5.4.1.
- 5.6. The approval mark shall be clearly legible and indelible.
- 5.7. The approval mark shall be placed close to or on the vehicle data plate affixed by the manufacturer.
- 5.8. Annex 2 to this Regulation gives examples of arrangements of the approval mark.

6. SPECIFICATIONS

6.1. General specifications

For the purpose of this Regulation, the vehicle shall fulfil the following requirements:

6.2. Acoustics characteristics

The sound emitted by the vehicle type submitted for approval shall be measured by the methods described in Annex 3 to this Regulation.

The speed range for operation is the range of greater than 0 km/h up to and inclusive 20 km/h.

If the vehicle that is not equipped with an AVAS fulfils the overall levels as specified in table 2 below with a margin of + 3 dB(A), the specification for one-third octave bands and the frequency shift do not apply.

6.2.1. Constant speed tests

6.2.1.1. The test speeds for approval are 10 km/h and 20 km/h.

6.2.1.2. When tested under the conditions of Annex 3 paragraph 3.3.2, the vehicle shall emit a sound

(a) That has a minimum overall sound pressure level for the applicable test speed according to Table 2 of paragraph 6.2.8;

(b) That has at least two of the one-third octave bands according to Table 2 of paragraph 6.2.8. At least one of these bands shall be below or within the 1 600 Hz one-third octave band;

(c) With minimum sound pressure levels in the chosen bands for the applicable test speed according to Table 2 of paragraph 6.2.8, column 3 or column 4.

6.2.1.3. If after a vehicle is tested in accordance with Annex 3 paragraph 3.3.2, for 10 consecutive times within a series of measurements without recording a valid measurement because the vehicle's internal combustion engine (ICE) remains active or restarts and interferes with the measurements, the vehicle is exempted from this particular test.

6.2.2. Reversing test

6.2.2.1. When tested under the conditions of Annex 3 paragraph 3.3.3 the vehicle must emit a sound that has a minimum overall sound pressure level according to Table 2 of paragraph 6.2.8, column 5.

6.2.2.2. If after a vehicle is tested in accordance with Annex 3, paragraph 3.3.3, for 10 consecutive times within a series of measurements without recording a valid measurement because the vehicle's ICE remains active or restarts and interferes with the measurements, the vehicle is exempted from this particular test.

6.2.3. Frequency shift to signify acceleration and deceleration

6.2.3.1. The intention of frequency shift is to acoustically inform road users about the change in vehicle speed.

6.2.3.2. When tested under the conditions of Annex 3 paragraph 4, at least one tone within the frequency range as specified in paragraph 6.2.8 emitted by the vehicle shall vary proportionally with speed within each individual gear ratio by an average of at least 0,8 % per 1 km/h in the speed range from 5 km/h to 20 km/h inclusive when driving in forward direction. In case more than one frequency is shifted, only one frequency shift needs to fulfil the requirements.

6.2.4. Stationary sound

The vehicle may emit a sound when stationary.

6.2.5. Driver selectable sounds

The vehicle manufacturer may define alternative sounds which can be selected by the driver; each of these sounds shall be in compliance and approved with the provisions in paragraphs 6.2.1 to 6.2.3.

6.2.6. Pause function

The manufacturer may install a function for temporary deactivation of the AVAS. Any other deactivation function, which does not satisfy the specification below, is prohibited.

6.2.6.1. The function shall be located so that it is operable by the driver in a normal seating position.

6.2.6.2. In the case when the pause function is activated, the suspension of AVAS has to be clearly indicated to the driver.

6.2.6.3. The AVAS shall be reactivated when the vehicle is started upon each vehicle turn-off.

6.2.6.4. Owner's manual information

If a pause function is installed, the manufacturer shall provide the owner with information (e.g. in the owner's manual) on its effect:

'The pause function of the Acoustic Vehicle Alerting System (AVAS) shall not be used unless for an obvious lack of necessity to emit sound for alert in the surrounding area and that it is certain that there are no pedestrians within the short distance.'

6.2.7. Specifications on maximum sound level for AVAS

When tested under the conditions of Annex 3 paragraph 3.3.2, a vehicle which is equipped with an AVAS, shall not emit an overall sound level of more than 75 dB(A), if driving in forward direction ⁽¹⁾.

⁽¹⁾ The maximum overall sound pressure level of 75 dB(A) measured at a distance of 2 m is corresponding to the overall sound pressure level of 66 dB(A) measured at a distance of 7,5 m. The limit value of 66 dB(A) at a distance of 7,5 m is the lowest permitted maximum value in Regulations established under the 1958 Agreement.

6.2.8. Minimum sound levels

The sound level measured in accordance with the provisions of Annex 3 to this Regulation, mathematically rounded to the nearest integer value, shall have at least the followings values:

Table 2

Minimum Sound Level Requirements in dB(A)

Frequency in Hz		Constant Speed Test paragraph 3.3.2 (10 km/h)	Constant Speed Test paragraph 3.3.2 (20 km/h)	Reversing Test para- graph 3.3.3
Column 1	Column 2	Column 3	Column 4	Column 5
Overall		50	56	47
1/3 rd Octave Bands	160	45	50	X
	200	44	49	
	250	43	48	
	315	44	49	
	400	45	50	
	500	45	50	
	630	46	51	
	800	46	51	
	1 000	46	51	
	1 250	46	51	
	1 600	44	49	
	2 000	42	47	
	2 500	39	44	
	3 150	36	41	
4 000	34	39		
5 000	31	36		

7. MODIFICATION AND EXTENSION OF APPROVAL OF A VEHICLE TYPE

7.1. Every modification of the vehicle type shall be notified to the Type Approval Authority which approved the vehicle type. The Type Approval Authority may then either:

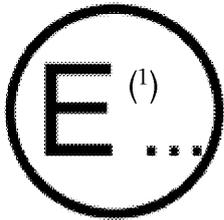
7.1.1. consider that the modifications made are unlikely to have an appreciable adverse effect and that in any case the vehicle still complies with the requirements, or

- 7.1.2. require a further test report from the Technical Service responsible for conducting the tests.
- 7.2. Confirmation or refusal of approval, specifying the alterations shall be communicated by the procedure specified in paragraph 5.3 above to the Parties to the Agreement applying this Regulation.
- 7.3. The Type Approval Authority issuing the extension of approval shall assign a series number for such an extension and inform thereof the other Parties to the 1958 Agreement applying this Regulation by means of a communication form conforming to the model in Annex 1 to this Regulation.
8. CONFORMITY OF PRODUCTION
- The conformity of production procedures shall comply with those set out in the Agreement, Appendix 2 (E/ECE/324-E/ECE/TRANS/505/Rev.2) with the following requirements:
- 8.1. Vehicles approved according to this Regulation shall be manufactured so as to conform to the type approved and satisfy the requirements set forth in paragraph 6.2 above.
- 8.2. The authority which has granted type approval may at any time verify the conformity control methods applied in each production facility. The normal frequency of these verifications shall be one every 2 years.
9. PENALTIES FOR NON-CONFORMITY OF PRODUCTION
- 9.1. The approval granted in respect of a vehicle type pursuant to this Regulation may be withdrawn if the requirements set forth above are not met.
- 9.2. If a Contracting Party to the Agreement applying this Regulation withdraws an approval it has previously granted, it shall forthwith so notify the other Contracting Parties applying this Regulation, by means of a communication form conforming to the model in Annex 1 to this Regulation.
10. PRODUCTION DEFINITELY DISCONTINUED
- If the holder of the approval completely ceases to manufacture a vehicle type approved in accordance with this Regulation, he shall so inform the authority which granted the approval. Upon receiving the relevant communication that authority shall inform thereof the other Parties to the 1958 Agreement applying this Regulation by means of a communication form conforming to the model in Annex 1 to this Regulation.
11. TRANSITIONAL PROVISIONS
- Until 30 June 2019 ISO 10844:1994 may be applied as an alternative to ISO 10844:2014 to check compliance of the test track as described in Annex 3, paragraph 2.1.2 of this Regulation.
12. NAMES AND ADDRESSES OF TECHNICAL SERVICES RESPONSIBLE FOR CONDUCTING APPROVAL TESTS AND OF TYPE APPROVAL AUTHORITIES
- The Contracting Parties to the 1958 Agreement applying this Regulation shall communicate to the United Nations Secretariat the names and addresses of the Technical Services responsible for conducting approval tests and of the Type Approval Authorities which grant approval and to which forms certifying approval or extension or refusal or withdrawal of approval, issued in other countries, are to be sent.
-

ANNEX 1

COMMUNICATION

(maximum format: A4 (210 × 297 mm))



issued by: Name of administration

.....
.....
.....

- concerning ⁽²⁾: Approval granted
- Approval extended
- Approval refused
- Approval withdrawn
- Production definitively discontinued

of a vehicle type with regard to its sound emission pursuant to Regulation No 138

Approval No Extension No

SECTION I

- 0.1. Make (trade name of manufacturer):
- 0.2. Vehicle Type:
- 0.3. Means of identification of type if marked on the vehicle ⁽³⁾:
- 0.3.1. Location of that marking:
- 0.4. Category of vehicle ⁽⁴⁾:
- 0.5. Propulsion principle (PEV/HEV/FCV/FCHV):
- 0.6. Company name and address of manufacturer:
- 0.7. Names and Address(es) of assembly plant(s):
- 0.8. Name and address of the manufacturer's representative (if any):

SECTION II

- 1. Additional information (where applicable): See Addendum
- 2. Technical service responsible for carrying out the tests:
- 3. Date of test report:
- 4. Number of test report:
- 5. Remarks (if any): See Addendum
- 6. Place:
- 7. Date:
- 8. Signature:
- 9. Reasons for Extensions
- Attachments:
- Information package
- Test report(s)

Addendum to the communication form No ...

Technical Information

0. General
 - 0.1. Make (trade name of manufacturer):
 - 0.2. Means of identification of type, if marked on the vehicle ⁽⁵⁾:
 - 0.2.1. Location of that marking:
 - 0.3. Category of vehicle ⁽⁶⁾:
 - 0.4. Company name and address of manufacturer:
 - 0.5. Name and address of the manufacturer's representative (if any):
 - 0.6. Name(s) and Address(es) of assembly plant(s):
1. Additional information
 - 1.1. Power plant
 - 1.1.1. Propulsion principle (PEV/HEV/FCV/FCHV):
 - 1.1.2. Manufacturer of the engine(s):
 - 1.1.3. Manufacturer's engine code(s):
 - 1.2. Description of AVAS (if applicable):
 - 1.2.1. Pause switch (yes/no)
 - 1.2.2. Sound at Stationary (yes/no)
 - 1.2.3. No of driver selectable sounds (1/2/3/...)
2. Test results
 - 2.1. Sound level of moving vehicle: dB(A) at 10 km/h
 - 2.2. Sound level of moving vehicle: dB(A) at 20 km/h
 - 2.3. Sound level of moving vehicle: dB(A) in reversing
 - 2.4. Frequency shift: %/km/h
3. Remarks

Technical Information Document ⁽⁷⁾

0. General
 - 0.1. Make (trade name of manufacturer):
 - 0.2. Type
 - 0.3. Means of identification of type, if marked on the vehicle ⁽⁸⁾:
 - 0.3.1. Location of that marking:
 - 0.4. Category of vehicle ⁽⁹⁾:
 - 0.5. Company name and address of manufacturer:
 - 0.6. Name and address of the manufacturer's representative (if any):
 - 0.8. Name(s) and Address(es) of assembly plant(s):
1. General construction characteristics of the vehicle
 - 1.1. Photographs and/or drawings of a representative vehicle:
 - 1.3. Number of axles and wheels ⁽¹⁰⁾:
 - 1.3.3. Powered axles (number, position, interconnection):
 - 1.6. Position and arrangement of the engine(s):
2. Masses and dimensions ⁽¹¹⁾ (in kg and mm) (Refer to drawing where applicable):
- 2.4. Range of vehicle dimensions (overall):

- 2.4.1 For chassis without bodywork:
- 2.4.1.1. Length:
- 2.4.1.2. Width:
- 2.4.2. For chassis with bodywork
- 2.4.2.1. Length:
- 2.4.2.2. Width:
- 2.6. Mass in running order
minimum and maximum:
- 3. Power plant ⁽¹²⁾
- 3.1. Manufacturer of the engine(s):
- 3.1.1. Manufacturer's engine code(s) (as marked on the engine(s), or other means of identification):
- 3.3. Electric motor
- 3.3.1. Type of the electric motor (winding, excitation):
- 3.4. Engine or motor combination:
- 3.4.4. Electric motor (describe each type of electric motor separately)
- 3.4.4.1. Make:
- 3.4.4.2. Type:
- 3.4.4.3. Maximum power: kW
- 6. Suspension
- 6.6. Tyre size
- 6.6.2. Upper and lower limits of rolling radii
- 6.6.2.1. Axle 1:
- 6.6.2.2. Axle 2:
- 6.6.2.3. Axle 3:
- 6.6.2.4. Axle 4:
- etc.
- 9. Bodywork
- 9.1. Type of bodywork:
- 9.2. Materials used and methods of construction:
- 12. Miscellaneous
- 12.5. Details of materials and components influencing the sound emission of the vehicle (if not covered by other items):
- 17. AVAS (if applicable)
- 17.1. Type of the AVAS (loudspeaker ...):
- 17.1.1. Make:
- 17.1.2. Type:
- 17.1.3. Geometrical characteristics (internal length and diameter)
- 17.2. The following documents are annexed to this communication:
- 17.2.1. ... drawings of the mountings of the sound emitting device(s),

17.2.2. ... drawings and diagrams giving the mounting positions and characteristics of the parts of the structure on which the devices are fitted.

17.2.3. ... over-all views of the front of the vehicle and of the compartment in which the device is situated and description of the component materials.

Signed:

Position in company:

Date:

⁽¹⁾ Distinguishing number of the country which has granted/extended/refused/withdrawn approval (see approval provisions in the Regulation).

⁽²⁾ Delete what does not apply.

⁽³⁾ If the means of identification of type contains characters not relevant to describe the vehicle types covered by the type-approval certificate such characters shall be represented in the documentation by the symbol: '?' (e.g. ABC??123??).

⁽⁴⁾ As defined in R.E. 3.

⁽⁵⁾ If the means of identification of type contains characters not relevant to describe the vehicle types covered by the type-approval certificate such characters shall be represented in the documentation by the symbol: '?' (e.g. ABC??123??).

⁽⁶⁾ As defined in R.E. 3.

⁽⁷⁾ Manufactures may automatically create this Technical Information Document by selecting the relevant items from the commonly agreed matrix. These items will appear in the Technical Information Document under the same numbers as in the matrix. Thus, the numbering of items in the Technical Information Document may not necessarily be continuous.

⁽⁸⁾ If the means of identification of type contains characters not relevant to describe the vehicle, types covered by the type-approval certificate such characters shall be represented in the documentation by the symbol: '?' (e.g. ABC??123??).

⁽⁹⁾ As defined in R.E. 3.

⁽¹⁰⁾ Only for the purpose of defining 'off-road vehicles'.

⁽¹¹⁾ (a) Standard ISO 612: 1978 — Road vehicles — Dimensions of motor vehicles and towed vehicles — terms and definitions.

(b) Where there is one version with a normal cab and another with a sleeper cab, both sets of masses and dimensions are to be stated.

(c) Optional equipment that affects the dimensions of the vehicle shall be specified.

⁽¹²⁾ In the case of a vehicle that can run either on petrol, diesel, etc., or also in combination with another fuel, items shall be repeated. In the case of non-conventional engines and systems, particulars equivalent to those referred here shall be supplied by the manufacturer.

ANNEX 2

ARRANGEMENTS OF THE APPROVAL MARK

MODEL A

(See paragraph 5.4 of this Regulation)



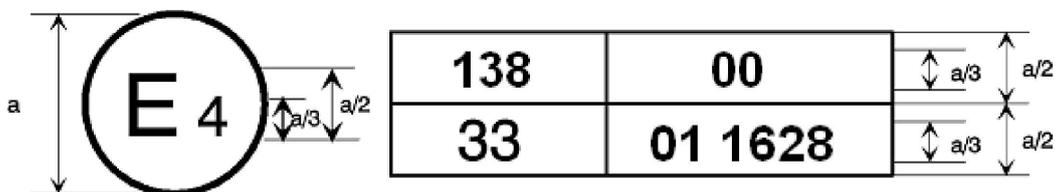
a = 8 mm min.

The above approval mark affixed to a vehicle shows that the vehicle type concerned has, with regard to its audibility, been approved in the Netherlands (E 4) pursuant to Regulation No 138 under approval No 002439.

The first two digits of the approval number indicate that Regulation No 138 already included the 00 series of amendments when the approval was granted.

MODEL B

(See paragraph 5.5 of this Regulation)



a = 8 mm min.

The above approval mark affixed to a vehicle shows that the vehicle type concerned has been approved in the Netherlands (E 4) pursuant to Regulations Nos 138 and 33 ⁽¹⁾. The approval numbers indicate that, at the dates when the respective approvals were granted, Regulation No 138 included the 00 series of amendments while Regulation No 33 included the 01 series of amendments.

⁽¹⁾ The latter number is given as an example only.

ANNEX 3

METHODS AND INSTRUMENTS FOR MEASURING THE SOUND MADE BY MOTOR VEHICLES

1. INSTRUMENTATION

1.1. Instruments for acoustic measurement

1.1.1. General

The apparatus used for measuring the sound pressure level shall be a sound level meter or equivalent measurement system meeting the requirements of Class 1 instruments (inclusive of the recommended windscreen, if used). These requirements are described in IEC 61672-1-2013.

The entire measurement system shall be checked by means of a sound calibrator that fulfils the requirements of Class 1 sound calibrators in accordance with IEC 60942-2003.

Measurements shall be carried out using the time weighting 'F' of the acoustic measurement instrument and the 'A' frequency weighting also described in IEC 61672-1-2013. When using a system that includes a periodic monitoring of the A-weighted sound pressure level, a reading should be made at a time interval not greater than 30 ms.

When measurements are carried out for one-third octaves, the instrumentation shall meet all requirements of IEC 61260-1-2014, class 1. When measurements are carried out for frequency shift, the digital sound recording system shall have at least a 16 bit quantisation. The sampling rate and the dynamic range shall be appropriate to the signal of interest.

The instruments shall be maintained and calibrated in accordance with the instructions of the instrument manufacturer.

1.1.2. Calibration

At the beginning and at the end of every measurement session, the entire acoustic measurement system shall be checked by means of a sound calibrator as described in paragraph 1.1.1. Without any further adjustment, the difference between the readings shall be less than or equal to 0,5 dB(A). If this value is exceeded, the results of the measurements obtained after the previous satisfactory check shall be discarded.

1.1.3. Compliance with requirements

Compliance of the sound calibrator with the requirements of IEC 60942-2003 shall be verified once a year. Compliance of the instrumentation system with the requirements of IEC 61672-3-2013 shall be verified at least every 2 years. All compliance testing shall be conducted by a laboratory which is authorised to perform calibrations traceable to the appropriate standards.

1.2. Instrumentation for speed measurements

The road speed of the vehicle shall be measured with instruments meeting specification limits of at least $\pm 0,5$ km/h when using continuous measuring devices.

If testing uses independent measurements of speed, this instrumentation shall meet specification limits of at least $\pm 0,2$ km/h.

1.3. Meteorological instrumentation

The meteorological instrumentation used to monitor the environmental conditions during the test shall meet the specifications of:

- (a) ± 1 °C or less for a temperature measuring device;
- (b) $\pm 1,0$ m/s for a wind speed-measuring device;
- (c) ± 5 hPa for a barometric pressure measuring device;
- (d) ± 5 % for a relative humidity measuring device.

2. ACOUSTIC ENVIRONMENT, METEOROLOGICAL CONDITIONS, AND BACKGROUND NOISE

2.1. Test site

2.1.1. General

The specifications for the test site provide the necessary acoustic environment to carry out the vehicle tests documented in this regulation. Outdoor and indoor test environments that meet the specifications of this regulation provide equivalent acoustic environments and produce results that are equally valid.

2.1.2. Outdoor testing

The test site shall be substantially level. The test track construction and surface shall meet the requirements of ISO 10844:2014.

Within a radius of 50 m around the centre of the track, the space shall be free of large reflecting objects such as fences, rocks, bridges or buildings. The test track and the surface of the site shall be dry and free from absorbing materials such as powdery snow, or loose debris.

In the vicinity of the microphones, there shall be no obstacle that could influence the acoustic field and no person shall remain between the microphone and the noise source. The meter observer shall be positioned so as not to influence the meter reading. Microphones shall be located as specified in Figures 1.

2.1.3. Indoor hemi anechoic or anechoic testing

This paragraph specifies conditions applicable when testing a vehicle, either operating as it would on the road with all systems operational, or operating in a mode where only the AVAS is operational.

The test facility shall meet requirements of ISO 26101:2012 with the following qualification criteria and measurement requirements appropriate to this test method.

Space to be deemed hemi-anechoic shall be defined as shown in Figure 3.

For qualifying the hemi acoustic space, the following evaluation shall be conducted:

- (a) A sound source location shall be placed on the floor in the middle of the space deemed to be anechoic;
- (b) Sound source shall provide a broadband input for measurement;
- (c) Evaluation shall be conducted in one-third-octave bands;
- (d) Microphone locations for evaluation shall be on a line from the source location to each position of microphones used for measurement in this Regulation as shown in Figure 3. This is commonly referred to as the microphone transverse;
- (e) A minimum of 10 points shall be used for evaluation on the microphone transverse line;
- (f) The one third octave bands used to establish hemi-anechoic qualification shall be defined to cover the spectral range of interest.

The test facility shall have a cut-off frequency, as defined in ISO 26101:2012, lower than the lowest frequency of interest. The lowest frequency of interest is the frequency below which there is no signal content relevant to the measurement of sound emission for the vehicle under test.

In the vicinity of the microphones, there shall be no obstacle that could influence the acoustic field and no person shall remain between the microphone and the noise source. The meter observer shall be positioned so as not to influence the meter reading. Microphones shall be located as specified in Figures 2.

2.2. Meteorological conditions

Metrological conditions are specified to provide a range of normal operating temperatures and to prevent abnormal readings due to extreme environmental conditions.

A value representative of temperature, relative humidity, and barometric pressure shall be recorded during the measurement interval.

The meteorological instrumentation shall deliver data representative for the test site and shall be positioned adjacent to the test area at a height representative of the height of the measuring microphone.

The measurements shall be made when the ambient air temperature is within the range from 5 °C to 40 °C.

The ambient temperature may of necessity be restricted to a narrower temperature range such that all key vehicle functionalities that can reduce vehicle noise emissions (e.g. start/stop, hybrid propulsion, battery propulsion, fuel-cell stack operation) are enabled according to manufacturer's specifications.

The tests shall not be carried out if the wind speed, including gusts, at microphone height exceeds 5 m/s, during the measurement interval.

2.3. Background noise

2.3.1. Measurement criteria for A-weighted sound pressure level

The background, or ambient noise, shall be measured for a duration of at least 10 seconds. A 10 second sample taken from these measurements shall be used to calculate the reported background noise, ensuring the 10 seconds sample selected is representative of the background noise in absence of any transient disturbance. The measurements shall be made with the same microphones and microphone locations used during the test.

When testing in an indoor facility, the noise emitted by the roller-bench, chassis dynamometer or other test facility equipment, without the vehicle installed or present, inclusive of the noise caused by air handling of the facility and vehicle cooling, shall be reported as the background noise.

The recorded maximum A-weighted sound pressure level from both microphones during the 10 second sample shall be reported as the background noise, L_{bgn} , for both left and right microphones.

For each 10 second sample at each microphone, the maximum to minimum range of the background noise, $\Delta L_{\text{bgn, p-p}}$, shall be reported.

The one-third-octave frequency spectrum, corresponding to the reported maximum level of background noise in the microphone with the highest background level, shall be reported.

As an aid for measurement and reporting of background noises see flowchart in Figure 4 of the Appendix to this annex.

2.3.2. Vehicle A-weighted sound pressure level measurement correction criteria

Depending on the level and the range of maximum to minimum value of the representative background noise A-weighted sound pressure level over a defined time period, the measured j^{th} test result within a test condition, $L_{\text{test},j}$, shall be corrected according to the table below to obtain the background noise corrected level $L_{\text{testcorr},j}$. Except where noted, $L_{\text{testcorr},j} = L_{\text{test},j} - L_{\text{corr}}$.

Background noise corrections to measurements are only valid when the range of the maximum to minimum background noise A-weighted sound pressure levels are 2 dB(A) or less.

In all cases where the range of the maximum to minimum background noise is greater than 2 dB(A), the maximum level of the background noise shall be 10 dB(A) or greater below the level of the measurement. When the maximum to minimum range of background noise is greater than 2 dB(A) and the level of the background noise is less than 10 dB(A) below the measurement, no valid measurement is possible.

Table 3

Correction for level of background noise when measuring vehicle A-weighted sound pressure level

Correction for background noise		
Range of maximum to minimum value of the representative background noise A-weighted sound pressure level over a defined time period $\Delta L_{\text{bgn, p-p}}$ in dB(A)	Sound pressure level of j-th test result minus background noise level $\Delta L = L_{\text{test,j}} - L_{\text{bgn}}$ in dB(A)	Correction in dB(A) L_{corr}
—	$\Delta L \geq 10$	no correction needed
≤ 2	$8 \leq \Delta L < 10$	0,5
	$6 \leq \Delta L < 8$	1,0
	$4,5 \leq \Delta L < 6$	1,5
	$3 \leq \Delta L < 4,5$	2,5
	$\Delta L < 3$	no valid measurement can be reported

If a sound peak obviously out of character with the general sound pressure level is observed, that measurement shall be discarded.

As an aid for measurement correction criteria see flowchart in Figure 4 of the appendix to this annex.

2.3.3. Background noise requirements when analysing in one-third-octave bands

When analysing one-third octaves according to this regulation, the level of background noise in each one-third octave of interest, analysed according to paragraph 2.3.1, shall be at least 6 dB(A) below the measurement of the vehicle or AVAS under test in each one-third-octave band of interest. The A-weighted sound pressure level of the background noise shall be at least 10 dB(A) below the measurement of the vehicle or AVAS under test.

Background compensation is not permitted for one-third octave band measurements.

As an aid for background noise requirements when analysing in one-third-octave bands see flowchart in Figure 6 of the Appendix to this annex.

3. TEST PROCEDURES FOR VEHICLE SOUND LEVEL

3.1. Microphone positions

The distance from the microphone positions on the microphone line PP' to the perpendicular reference line CC' as specified in Figures 1 and 2 on the test track or in an indoor test facility shall be 2,0 m \pm 0,05 m.

The microphones shall be located 1,2 m \pm 0,02 m above the ground level. The reference direction for free field conditions as specified in IEC 61672-1:2013 shall be horizontal and directed perpendicularly towards the path of the vehicle line CC'.

3.2. Conditions of the vehicle

3.2.1. General conditions

The vehicle shall be representative of vehicles to be put on the market as specified by the manufacturer in agreement with the technical service to fulfil the requirements of this Regulation.

Measurements shall be made without any trailer, except in the case of non-separable vehicles.

In the case of HEVs/FCHVs, the test shall be carried out in the most energy efficient mode so to avoid the restart of the ICE, e.g. all audio-, entertainment-, communication- and navigation-systems shall be switched off.

Before the measurements are started, the vehicle shall be brought to its normal operating conditions.

3.2.2. Battery state of charge

If so equipped, propulsion batteries shall have a state-of-charge sufficiently high to enable all key functionalities according to the manufacturer's specifications. Propulsion batteries shall be within their component-temperature window to enable all key functionalities that could reduce vehicle sound emissions. Any other type of rechargeable energy storage system shall be ready to operate during the test.

3.2.3. Multi-mode operation

If the vehicle is equipped with multiple driver selectable operating modes, the mode which provides the lowest sound emission during the test conditions of paragraph 3.3 shall be selected.

When the vehicle provides multiple operating modes that are automatically selected by the vehicle, it is the responsibility of the manufacturer to determine the correct manner of testing to achieve the minimum sound emission.

In cases where it is not possible to determine the vehicle operating mode providing the lowest sound emission, all modes shall be tested and the mode giving the lowest test result shall be used to report the vehicle sound emission in accordance with this regulation.

3.2.4. Test mass of vehicle

Measurements shall be made on vehicles at mass in running order with an allowable tolerance of 15 %.

3.2.5. Tyre selection and condition

The tyres fitted to the vehicle during testing are selected by the vehicle manufacturer, and shall correspond to one of the tyre sizes and types designated for the vehicle by the vehicle manufacturer.

The tyres shall be inflated to the pressure recommended by the vehicle manufacturer for the test mass of the vehicle.

3.3. Operating conditions

3.3.1. General

For each operating condition, the vehicle can be tested either indoor or outdoor.

For constant speed and reversing tests the vehicle may be tested either in motion or in simulated operating condition. For simulated vehicle operation, signals shall be applied to the vehicle to simulate actual in-use operation.

If the vehicle is equipped with an internal combustion engine, it shall be turned off.

3.3.2. Constant speed tests

These tests are conducted with the vehicle in forward motion or with the vehicle speed simulated by an external signal to the AVAS with the vehicle in standstill condition.

3.3.2.1. Constant speed tests in forward motion

For a vehicle tested in an outdoor facility, the path of the centreline of the vehicle shall follow line CC' as closely as possible with constant speed v_{test} throughout the entire test. The front plane of the vehicle shall cross the line AA' at the start of the test and the rear plane of the vehicle shall cross the line BB' at the end of the test, as shown in Figure 1a. Any trailer, which is not readily separable from the towing vehicle, shall be ignored when considering the crossing of the line BB'.

A vehicle tested in an indoor facility, shall be located with the front plane of the vehicle on the PP' line as shown in Figure 2a. The vehicle shall maintain a constant test speed, v_{test} for at least 5 seconds.

For constant speed test condition of 10 km/h, the test speed v_{test} shall be 10 km/h \pm 2 km/h.

For constant speed test condition of 20 km/h, the test speed v_{test} shall be 20 km/h \pm 1 km/h.

For automatic transmission vehicles, the gear selector shall be placed as specified by the manufacturer for normal driving.

For manual transmission vehicles, the gear selector shall be placed in the highest gear which can achieve the target vehicle speed with constant engine speed.

3.3.2.2. Constant speed tests simulated by an external signal to the AVAS with the vehicle in standstill condition

A vehicle tested in an indoor or outdoor facility, shall be located with the front plane of the vehicle on the PP' line as shown in Figure 2b. The vehicle shall maintain a constant simulated test speed, v_{test} for at least 5 seconds.

For constant speed test condition of 10 km/h, the simulated test speed v_{test} shall be 10 km/h \pm 0,5 km/h.

For constant speed test condition of 20 km/h, the simulated test speed v_{test} shall be 20 km/h \pm 0,5 km/h

3.3.3. Reversing tests

These tests may be conducted with the vehicle in rearward motion or with the vehicle speed simulated by an external signal to the AVAS with the vehicle in standstill condition.

3.3.3.1. Reversing test in motion

For a vehicle tested in an outdoor facility, the path of the centreline of the vehicle shall follow line CC' as closely as possible with constant speed v_{test} throughout the entire test. The rear plane of the vehicle shall cross the line AA' at the start of the test and the front plane of the vehicle shall cross the line BB' at the end of the test, as shown on Figure 1b. Any trailer, which is not readily separable from the towing vehicle, shall be ignored when considering the crossing of the line BB'.

A vehicle tested in an indoor facility, shall be located with the rear plane of the vehicle on the PP' line as shown in Figure 2b. The vehicle shall maintain a constant test speed, v_{test} for at least 5 seconds.

For constant speed test condition of 6 km/h, the test speed v_{test} shall be 6 km/h \pm 2 km/h.

For automatic transmission vehicles, the gear selector shall be placed as specified by the manufacturer for normal reverse driving.

For manual transmission vehicles, the gear selector shall be placed in the highest reverse gear which can achieve the target vehicle speed with constant engine speed.

3.3.3.2. Reversing test simulated by an external signal to the AVAS with the vehicle in standstill condition.

A vehicle tested in an indoor or outdoor facility, shall be located with the rear plane of the vehicle on the PP' line as shown in Figure 2b. The vehicle shall maintain a constant simulated test speed, v_{test} for at least 5 seconds.

For constant speed test condition of 6 km/h, the simulated test speed v_{test} shall be 6 km/h \pm 0,5 km/h.

3.3.3.3. Reversing test in standstill condition

A vehicle tested in an indoor or outdoor facility, shall be located with the rear plane of the vehicle on the PP' line as shown in Figure 2b.

The vehicle's gear selection control shall be in the reverse position and the brake released for the test.

3.4. Measurement readings and reported values

At least four measurements for each test condition shall be made on both sides of the vehicle.

The first four valid consecutive measurement results for each test condition, within 2,0 dB(A) per side, allowing for the deletion of non-valid results, shall be used for the calculation of the intermediate or final result.

If a sound peak obviously out of character with the general sound pressure level is observed, that measurement shall be discarded. For measurement of a vehicle in motion (forward and reversing) outdoor, the maximum A-weighted sound pressure level indicated during each passage of the vehicle between AA' and PP' ($L_{\text{test},j}$) shall be noted for each microphone position, to the first significant digit after the decimal place (for example XX,X). For measurement of a vehicle in motion indoor and in standstill (forward and reversing), the maximum A-weighted sound pressure level indicated during each period of 5 seconds for each microphone position, $L_{\text{test},j}$, shall be noted, to the first significant digit after the decimal place (for example XX,X).

$L_{\text{test},j}$ shall be corrected according to paragraph 2.3.2 to obtain $L_{\text{testcorr},j}$.

For each maximum A-weighted sound pressure level, the corresponding one-third-octave spectrum shall be reported for each microphone position. No background correction shall be applied to any measured one-third octave result.

3.5. Data compilation and reported results

For each test condition described in paragraph 3.3, the background corrected results, $L_{\text{testcorr},j}$, and the corresponding one third octave spectra of both sides of the vehicle individually shall be arithmetically averaged and rounded to the first decimal place.

The final A-weighted sound pressure level results $L_{\text{crs } 10}$, $L_{\text{crs } 20}$ and L_{reverse} to be reported are the lower values of the two averages of both sides, rounded to the nearest integer. The final one third octave spectra to be reported are the spectra corresponding to the same side as the reported A-weighted sound pressure level.

4. TEST PROCEDURES FOR FREQUENCY SHIFT

4.1. General

The provisions on frequency shift outlined in 6.2.3 of the main body shall be checked using one of the following test methods to be selected by the manufacturer:

Method (A) Test of the complete vehicle in motion on an outdoor test track

Method (B) Test of the complete vehicle in standstill condition on an outdoor test track with simulation of the vehicle movement to the AVAS by an external signal generator

- Method (C) Test of the complete vehicle in motion in an indoor facility on a chassis dynamometer
- Method (D) Test of the complete vehicle in standstill condition in an indoor facility with simulation of the vehicle movement to the AVAS by an external signal generator
- Method (E) Test of the AVAS without a vehicle in an indoor facility with simulation of the vehicle movement to the AVAS by an external signal generator

The facility requirements as well as the vehicle and test setup specifications are the same as given in paragraphs 1, 2, 3.1 and 3.2 of this annex according to the selected test method unless the following paragraphs below provide different or additional specifications.

No background noise correction shall be applied to any measurement. Special care must be given for outdoor measurements. Any interference of the background noise shall be avoided. If a sound peak obviously out of character with the general signal is observed, that measurement shall be discarded.

4.2. Instrumentation and signal processing

Analyser settings shall be agreed between the manufacturer and the technical service to provide data according to these requirements.

The sound analysis system shall be capable of performing spectral analysis at a sampling rate and over a frequency range containing all frequencies of interest. The frequency resolution shall be sufficiently precise to differentiate between the frequencies of the various test conditions.

4.3. Test methods

4.3.1. Method (A) — Outdoor facility and vehicle in motion

The vehicle shall be operated in the same outdoor test facility and according to the same general operating condition as for the vehicle constant speed testing (paragraph 3.3.2).

The vehicle sound emission shall be measured at target speeds of 5 km/h to 20 km/h in steps of 5 km/h with a tolerance of ± 2 km/h for the speed of 10 km/h or less and of ± 1 km/h for any other speeds. The speed of 5 km/h is the lowest target speed. If the vehicle cannot be operated at this speed within the given precision, the lowest possible speed below 10 km/h shall be used instead.

4.3.2. Method (B) and Method (D) — Outdoor/Indoor facility and vehicle in standstill

The vehicle shall be operated in a test facility where the vehicle can accept an external vehicle speed signal to the AVAS simulating vehicle operation. The microphone locations shall be as for the complete vehicle test conditions as specified in Figure 2a. The front plane of the vehicle shall be placed on line PP'.

The vehicle sound emission shall be measured at simulated speeds of 5 km/h to 20 km/h in steps of 5 km/h with a tolerance of $\pm 0,5$ km/h for each test speed.

4.3.3. Method (C) — Indoor facility and vehicle in motion

The vehicle shall be installed in an indoor test facility where the vehicle can operate on a chassis dynamometer in the same manner as outdoors. All microphone locations shall be as for the vehicle test conditions as specified in Figure 2a. The front plane of the vehicle shall be placed on line PP'.

The vehicle sound emission shall be measured at target speeds of 5 km/h to 20 km/h in steps of 5 km/h with a tolerance of ± 2 km/h for the speed of 10 km/h or less and of ± 1 km/h for any other speeds. The speed of 5 km/h is the lowest target speed. If the vehicle cannot be operated at this speed within the given precision, the lowest possible speed below 10 km/h shall be used instead.

4.3.4. Method (E)

The AVAS shall be mounted rigidly in an indoor facility, by means of the equipment indicated by the manufacturer. The microphone of the measuring instrument shall be placed at 1 m distance from the AVAS in the direction where the subjective sound level is greatest and placed at a height of approximately the same level as the sound radiation of the AVAS.

The sound emission shall be measured at simulated speeds of 5 km/h to 20 km/h in steps of 5 km/h with a tolerance of $\pm 0,5$ km/h for each test speed.

4.4. Measurement Readings

4.4.1. Test Method (A)

At least four measurements shall be made at every speed specified in paragraph 4.3.1. The emitted sound shall be recorded during each passage of the vehicle between AA' and BB' for each microphone position. From each measurement sample a segment taken from AA' until 1 meter before PP' shall be cut out for further analysis.

4.4.2. Test Methods (B), (C), (D) and (E)

The emitted sound shall be measured at every speed specified in correlated paragraphs above for at least 5 seconds.

4.5. Signal Processing

For each recorded sample the average auto power spectrum shall be determined, using a Hanning window and at least 66,6 % overlap averages. The frequency resolution shall be chosen to be sufficiently narrow as to allow a separation of the frequency shift per target condition. The reported speed per sample segment is the average vehicle speed over the time of the sample segment rounded to the first decimal place.

In case of test method (A) the frequency that is intended to be changed with the speed shall be determined per sample segment. The reported frequency per target condition f_{speed} shall be the mathematical average of the frequencies determined per measurement sample and rounded to the nearest integer. The reported speed per target condition shall be the mathematical average of the four sample segments.

Table 4

Analysis of the shifted frequency per target condition per side

Target speed	Test run per target condition	Reported speed (average per sample segment)	Determined frequency of interest (f_{speed})	Reported Speed per target condition (average of the reported speeds)	Reported frequency of interest per target condition (f_{speed})
km/h	No	km/h	Hz	km/h	Hz
5	1				
	2				
	3				
	4				

Target speed	Test run per target condition	Reported speed (average per sample segment)	Determined frequency of interest ($f_{j, \text{speed}}$)	Reported Speed per target condition (average of the reported speeds)	Reported frequency of interest per target condition (f_{speed})
km/h	No	km/h	Hz	km/h	Hz
10	1				
	2				
	3				
	4				
15	1				
	2				
	3				
	4				
20	1				
	2				
	3				
	4				

For all other test methods the derived frequency spectrum shall directly be used for the further calculation.

4.5.1. Data compilation and reported results

The frequency intended to be shifted shall be used for the further calculation. The frequency of the lowest reported test speed rounded to the nearest integer is taken as the reference frequency f_{ref} .

For the other vehicle speeds, the corresponding shifted frequencies f_{speed} rounded to the nearest integer shall be taken from the spectra analysis. Calculate Δf , the frequency shift of the signal according to equation (1):

$$\Delta f = \left\{ \left[(f_{\text{speed}} - f_{\text{ref}}) / (v_{\text{test}} - v_{\text{ref}}) \right] / f_{\text{ref}} \right\} \cdot 100 \quad \text{equation (1)}$$

where

f_{speed} is the frequency at a given speed value;

f_{ref} is the frequency at the reference speed of 5 km/h or the lowest reported speed;

v_{test} is the vehicle speed, actual or simulated, corresponding to the frequency f_{speed} ;

v_{ref} is the vehicle speed, actual or simulated, corresponding to the frequency f_{ref} ;

The results shall be reported using the following table:

Table 5

Report table, to be completed for each frequency analysed

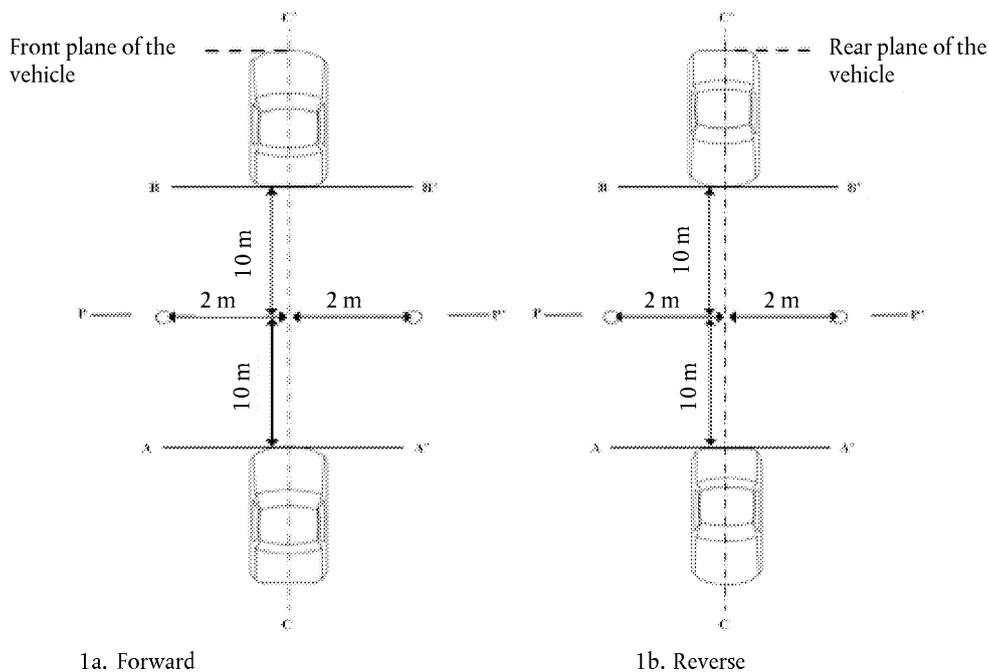
		Test Results at Target Speeds			
		5 km/h (Reference)	10 km/h	15 km/h	20 km/h
Reported Speed	km/h				
Frequency, f_{speed} , Left Side	Hz				
Frequency, f_{speed} , Right Side	Hz				
Frequency Shift, Left Side	%	n.a.			
Frequency Shift, Right Side	%	n.a.			

APPENDIX

FIGURES AND FLOWCHARTS

Figures 1a and 1b

Measuring positions for vehicles in motion outdoor



Figures 2a and 2b

Measuring positions for vehicles in motion indoor and in standstill

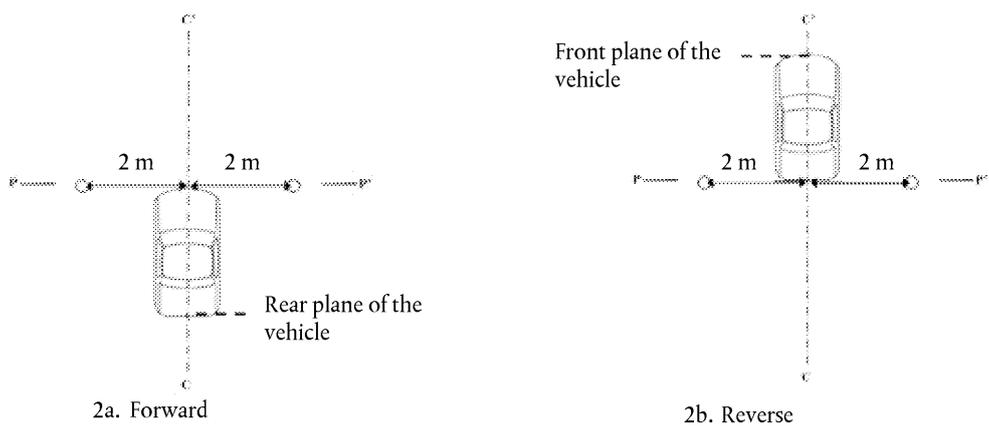


Figure 3

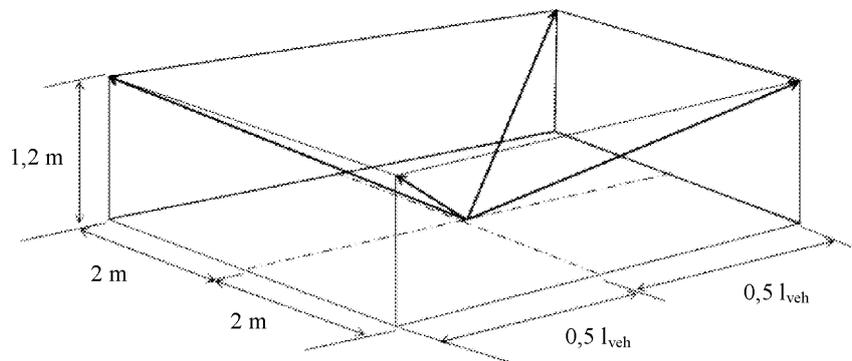
Minimum space to be qualified as Semi-Anechoic chamber

Figure 4

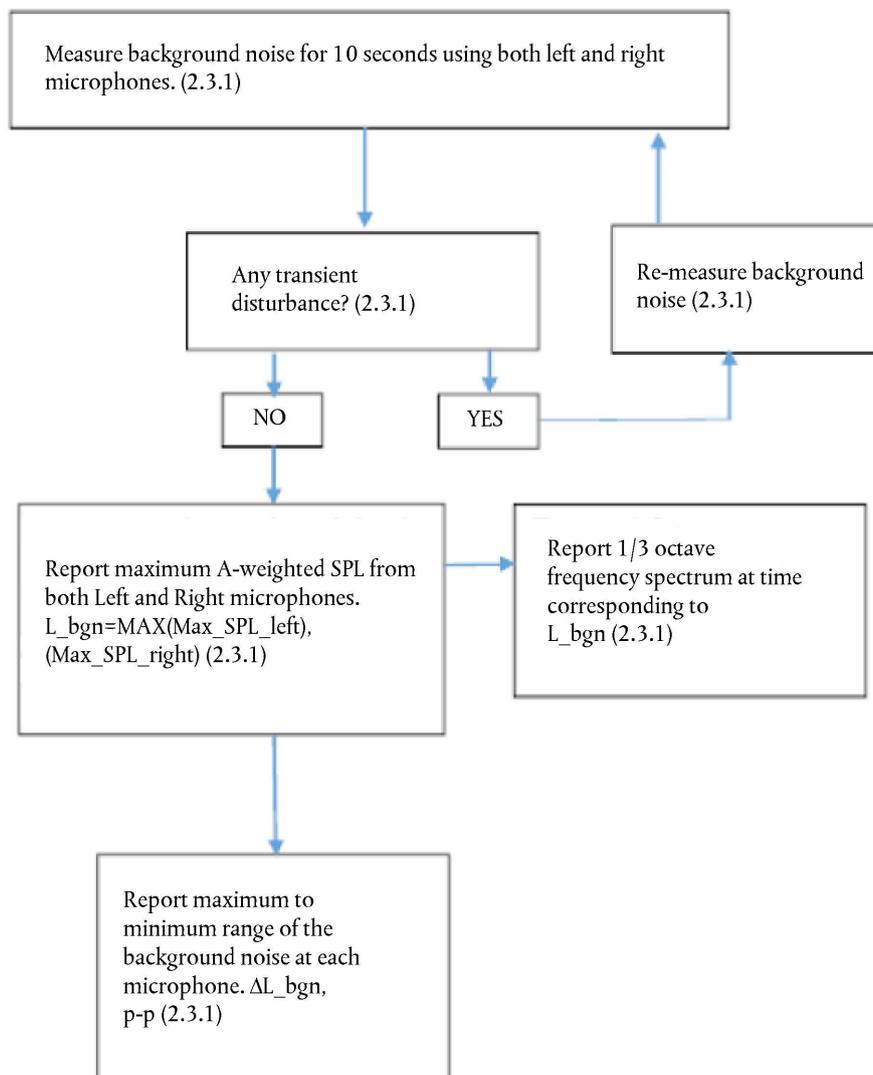
Determination of the range of background noise

Figure 5

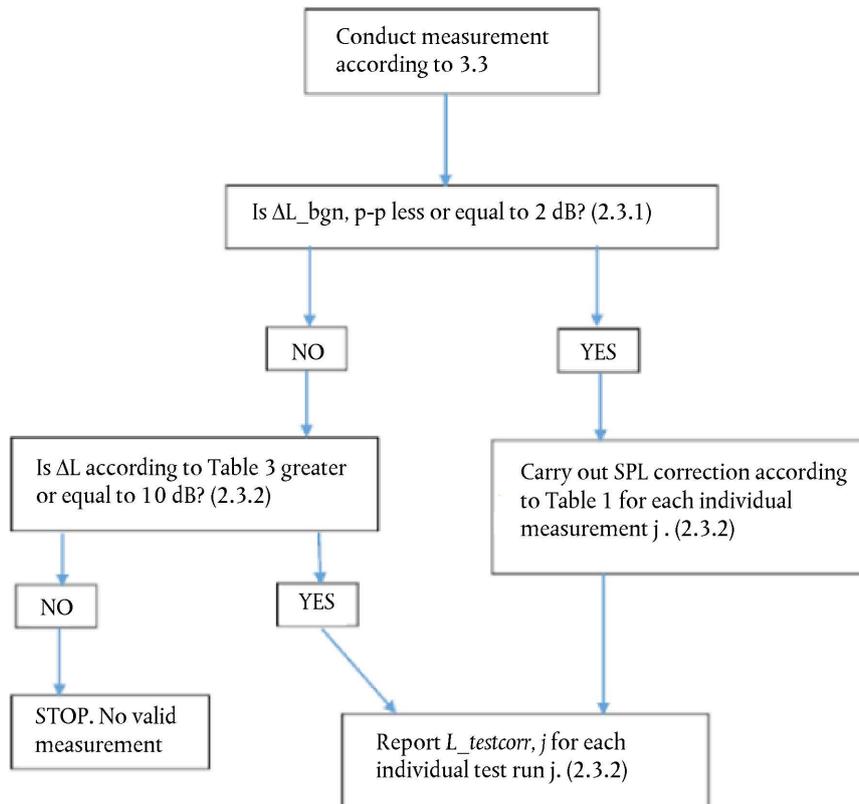
Vehicle A-Weighted sound pressure level measurement correction criteria

Figure 6

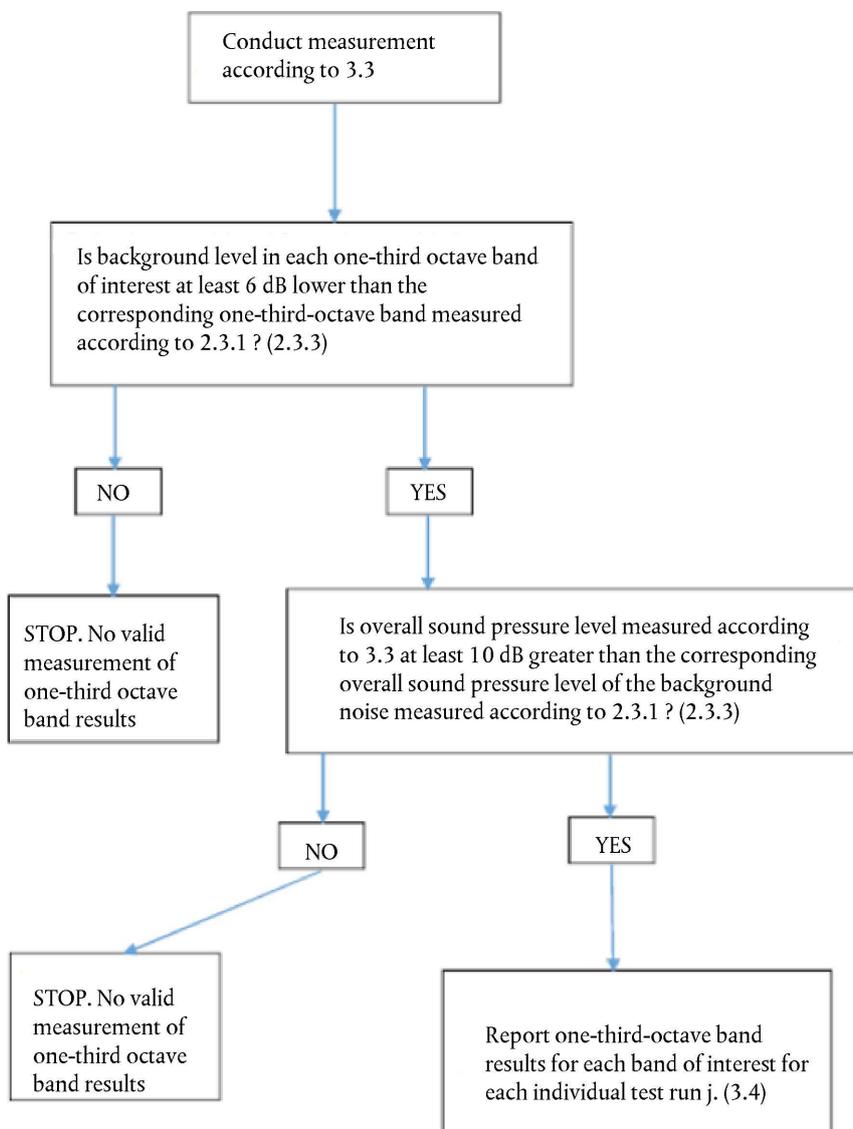
Background noise requirements for analysis in one-third-octave bands

Figure 7a

Test procedures for measurement of frequency shift

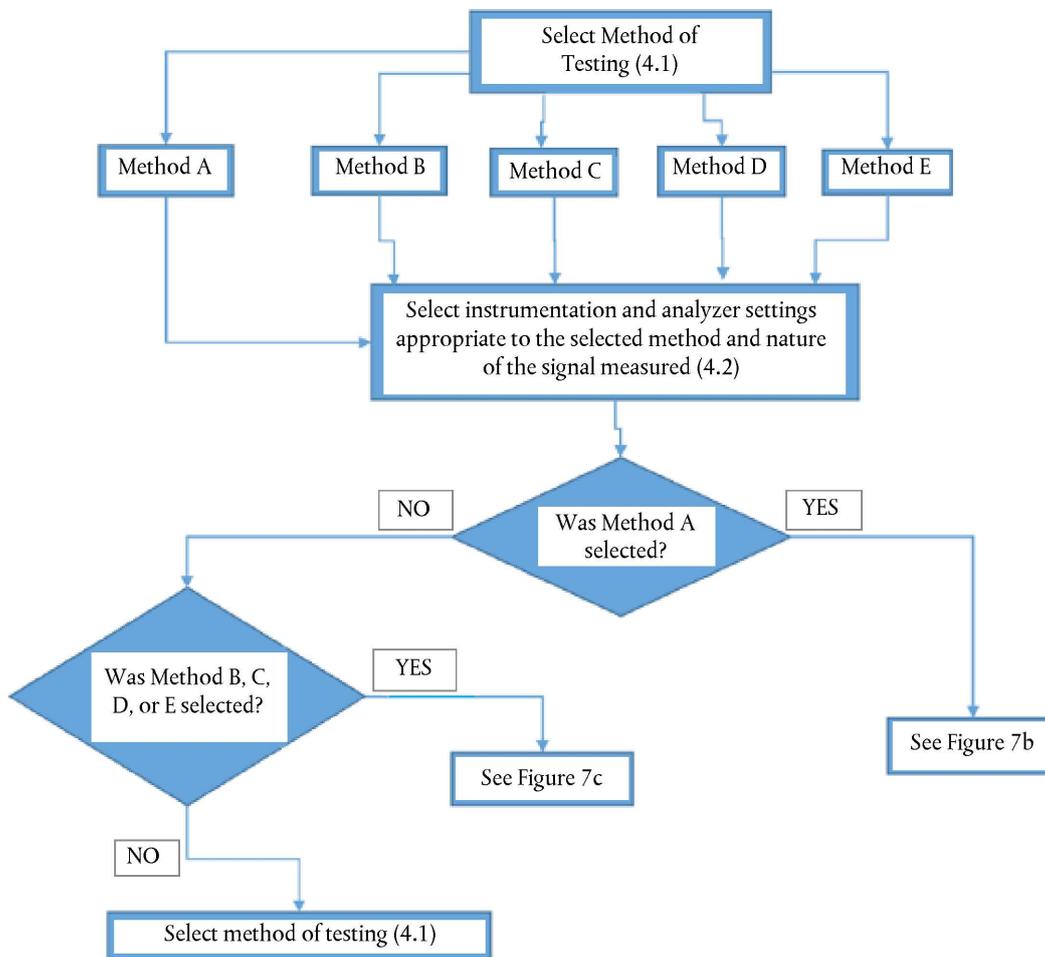


Figure 7b

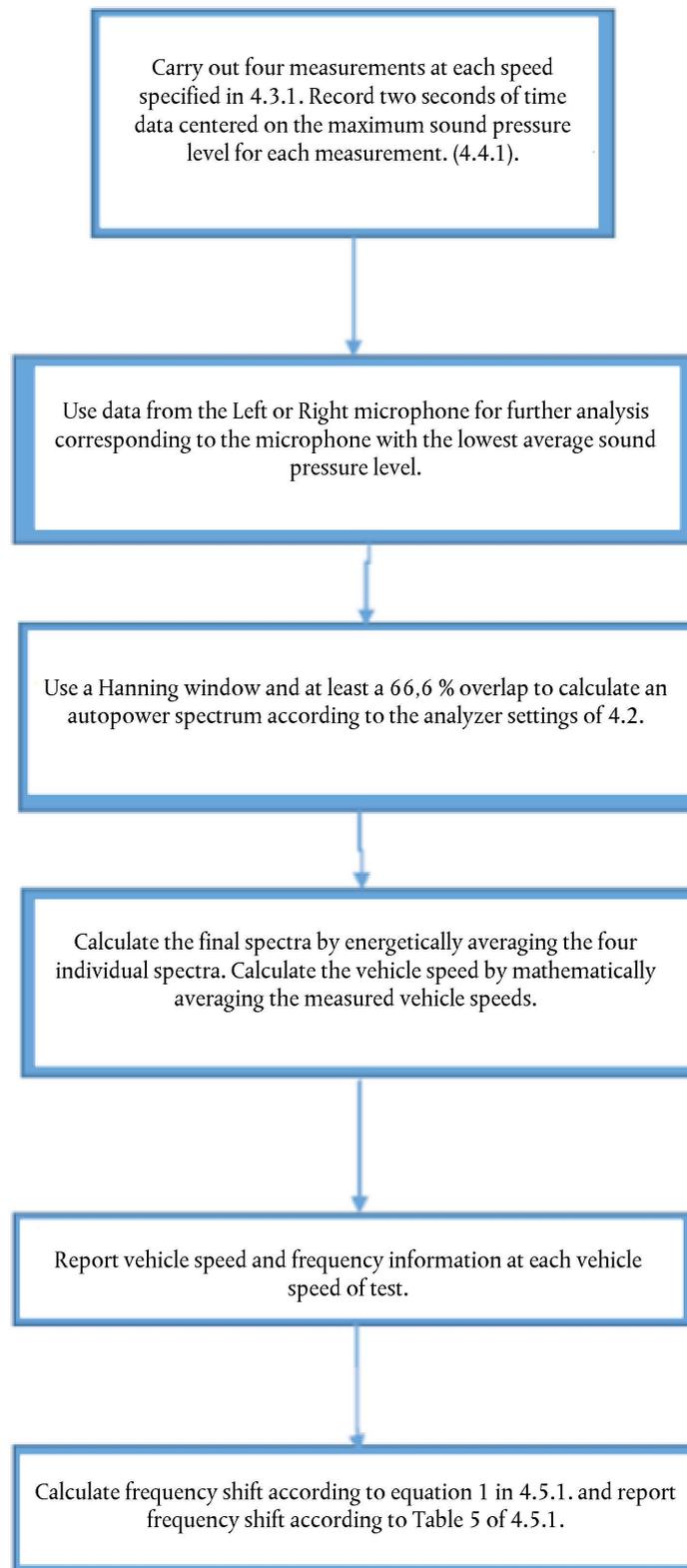
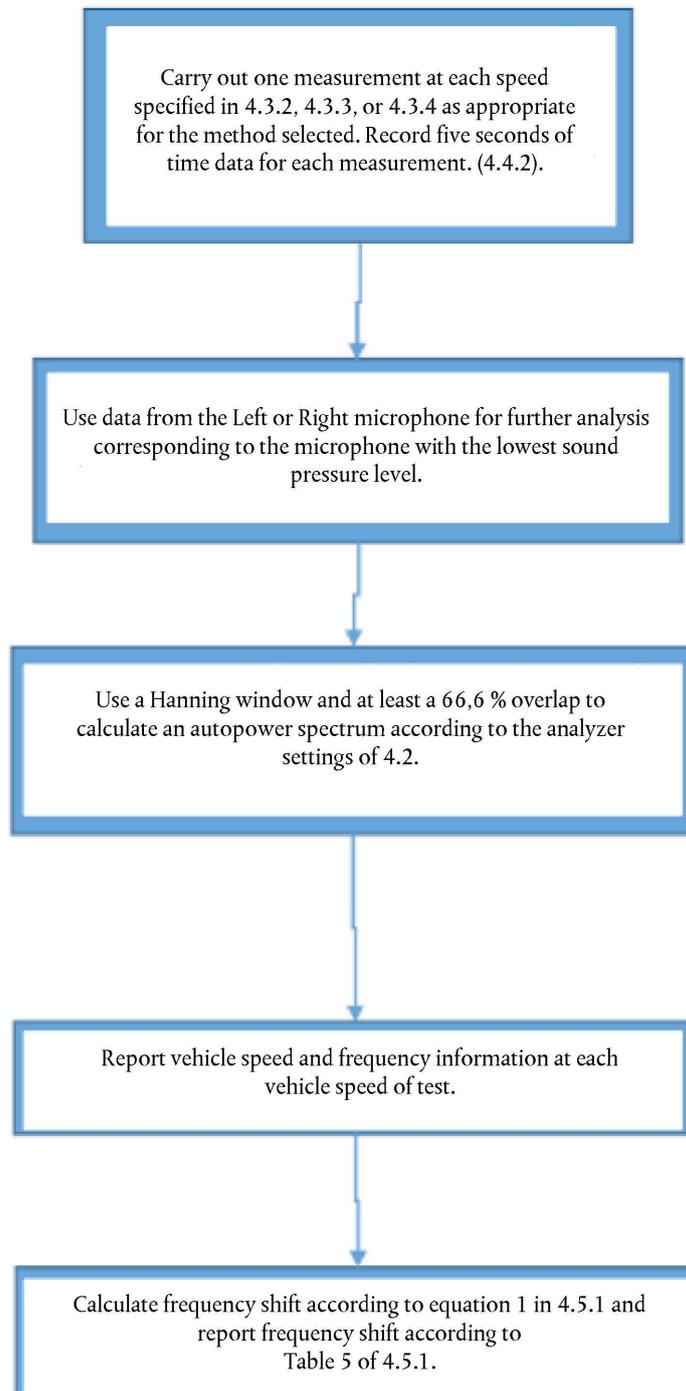
Test procedures for measurement of frequency shift, Method A

Figure 7c

Test procedures for measurement of frequency shift, Methods B, C, D, and E

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