COMMISSION REGULATION (EU) No 1304/2014

of 26 November 2014

on the technical specification for interoperability relating to the subsystem 'rolling stock — noise' amending Decision 2008/232/EC and repealing Decision 2011/229/EU

(Text with EEA relevance)

THE EUROPEAN COMMISSION,

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

Having regard to Directive 2008/57/EC of the European Parliament and of the Council of 17 June 2008 on the interoperability of the rail system within the Community, and in particular Article 6(1) thereof ([1]),

Whereas:

(1) Article 12 of Regulation (EC) No 881/2004 of the European Parliament and of the Council ([2]) requires the European Railway Agency (the Agency) to ensure that the technical specifications for interoperability (TSIs) are adapted to technical progress, market trends and social requirements, and to propose to the Commission any amendments to the TSIs which it considers necessary.

(2) By Decision C(2010) 2576 of 29 April 2010, the Commission gave the Agency a mandate to develop and review the TSIs with a view to extending their scope to the whole rail system in the Union, and to carry out a study on the pertinence of merging the noise requirements for high-speed and conventional rolling stock ('HS' and 'CR' RST). The conclusion of the study ERA/REP/13-2011/INT was that one TSI should cover both CR and HS RST. In consequence, noise requirements for CR and HS RST should be merged.

(3) Section 7.2 of the Annex to Commission Decision 2011/229/EU ([3]) provides for a comprehensive review and updating by the Agency of the TSI relating to noise based on which a report and, if necessary, a proposal should be submitted to the Commission.

(4) On 3 September 2013 the Agency submitted recommendation ERA/REC/07-2013/REC on the adoption of the TSI relating to noise.

(5) In order to adapt to technological progress and encourage modernisation, innovative solutions should be promoted and their implementation should, under certain conditions, be accepted. Where an innovative solution is proposed, the manufacturer or his authorised representative should state in what way it deviates from or how it complements the relevant provision of the TSI. The innovative solution should be assessed by the Commission. If this assessment is positive, the Agency should develop the appropriate functional and interface specifications of the innovative solution, as well as the relevant assessment methods.

(6) In a mid-term, an analysis should be made with a view to reducing noise emitted by existing vehicles while taking into account the competitiveness of the rail sector. It concerns especially freight wagons and is important in order to increase acceptance of rail freight traffic among the citizens.

(7) In accordance with Article 17(3) of Directive 2008/57/EC, Member States are to notify the Commission and the other Member States the conformity assessment and verification procedures to be used for specific cases as well as the bodies responsible for carrying out those procedures.

(8) Rolling stock currently operates under existing national, bilateral, multilateral or international agreements. It is important that those agreements do not hinder current and future progress towards interoperability. The Member States should therefore notify such agreements to the Commission.

(9) Decision 2011/229/EU should therefore be repealed.

([1]) OJ L 191, 18.7.2008, p. 1.
([2]) Regulation (EC) No 881/2004 of the European Parliament and of the Council of 29 April 2004 establishing a European Railway Agency (Agency Regulation) (OJ L 220, 21.6.2004, p. 3).
([3]) Commission Decision 2011/229/EU of 4 April 2011 concerning the technical specifications of interoperability relating to the subsystem 'rolling stock — noise' of the trans-European conventional rail system (OJ L 99, 13.4.2011, p. 1).

(10) Commission Decision 2008/232/EC ([1]) should be amended accordingly as regards the limits for stationary noise, the interior noise levels and the boundary characteristics linked to exterior noise.

(11) The measures provided for in this Regulation are in accordance with the opinion of the Committee established in accordance with Article 29(1) of Directive 2008/57/EC,

HAS ADOPTED THIS REGULATION:

Article 1

This Regulation lays down the technical specification for interoperability (TSI) relating to the 'rolling stock — noise' subsystem of the rail system in the Union, as set out in the Annex.

Article 2

The TSI shall apply to the rolling stock which falls within the scope of Commission Regulation (EU) No 1302/2014 ([2]) and Commission Regulation (EU) No 321/2013 ([3]).

Article 3

Within six months of the entry into force of this Regulation, Member States shall notify the Commission of all agreements containing requirements relating to noise emission limits, provided they were not already notified under Commission Decisions 2006/66/EC ([4]) or 2011/229/EU.

The agreements to be notified shall be:

(a) national agreements between the Member States and railway undertakings or infrastructure managers, agreed on either a permanent or a temporary basis and necessitated by the specific or local nature of the intended transport service;

(b) bilateral or multilateral agreements between railway undertakings, infrastructure managers or safety authorities which deliver significant levels of local or regional interoperability;

(c) international agreements between one or more Member States and at least one third country, or between railway undertakings or infrastructure managers of Member States and at least one railway undertaking or infrastructure manager of a third country which deliver significant levels of local or regional interoperability.

Article 4

The procedures for assessment of conformity, suitability for use and EC verification set out in Section 6 of the Annex to this Regulation shall be based on the modules defined in Commission Decision 2010/713/EU ([5]).

Article 5

1. With regard to the specific cases listed in Section 7.3.2 of the Annex, the conditions to be met for the verification of interoperability in accordance with Article 17(2) of Directive 2008/57/EC shall be the applicable technical rules in use in the Member State which authorises the placing in service of the subsystems covered by this Regulation.

([1]) Commission Decision 2008/232/EC of 21 February 2008 concerning a technical specification for interoperability relating to the rolling stock sub-system of the trans-European high-speed rail system (OJ L 84, 26.3.2008, p. 132).

([2]) Commission Regulation (EU) No 1302/2014 of 18 November 2014 concerning a technical specification for interoperability relating to the 'rolling stock — locomotives and passenger rolling stock' subsystem of the rail system in the European Union (See page 228 of this Official Journal).

([3]) Commission Regulation (EU) No 321/2013 of 13 March 2013 concerning the technical specification for interoperability relating to the subsystem 'rolling stock — freight wagons' of the rail system in the European Union and repealing Decision 2006/861/EC (OJ L 104, 12.4.2013, p. 1).

([4]) Commission Decision 2006/66/EC of 23 December 2005 concerning the technical specification for interoperability relating to the subsystem rolling stock — noise of the trans-European conventional rail system (OJ L 37, 8.2.2006, p. 1).

([5]) Commission Decision 2010/713/EU of 9 November 2010 on modules for the procedures for assessment of conformity, suitability for use and EC verification to be used in the technical specifications for interoperability adopted under Directive 2008/57/EC of the European Parliament and of the Council (OJ L 319, 4.12.2010, p. 1).

2. Within six months of the entry into force of this Regulation, each Member State shall inform the Commission and the Member States about:

(a) the technical rules referred to in paragraph 1;

(b) the conformity assessment and verification procedures to be carried out in application of the technical rules referred to in paragraph 1;

(c) the bodies designated in accordance with Article 17(3) of Directive 2008/57/EC in order to carry out the conformity assessment and verification procedures with respect to the specific cases set out in Section 7.3.2 of the Annex to this Regulation.

Article 6

Compliance with the lower exposure action values set out in Article 3 of Directive 2003/10/EC of the European Parliament and of the Council [1] shall be ensured by compliance with the driver's cabin interior noise level, as set out in point 4.2.4 of the Annex to this Regulation as well as by appropriate operational conditions to be defined by the railway undertaking.

Article 7

1. In order to adapt to technological progress, innovative solutions may be proposed by the manufacturer or its authorised representative which do not comply with the specifications set out in the Annex and/or for which the assessment methods set out in the Annex cannot be applied.

2. Innovative solutions may be related to the rolling stock subsystem, its parts and its interoperability constituents.

3. Where an innovative solution is proposed, the manufacturer or his authorised representative established within the Union shall state in what way it deviates from or how it complements the relevant provisions of this TSI and shall submit the deviations to the Commission for analysis. The Commission may request the opinion of the Agency on the proposed innovative solution.

4. The Commission shall deliver an opinion on the proposed innovative solution. If this opinion is positive, the appropriate functional and interface specifications and the assessment method, which need to be included in the TSI in order to allow the use of this innovative solution, shall be developed by the Agency and subsequently integrated into the TSI during the revision process pursuant to Article 6 of Directive 2008/57/EC. If the opinion is negative, the proposed innovative solution shall not be used.

5. Pending the review of the TSI, a positive opinion delivered by the Commission shall be considered as an acceptable means of compliance with the essential requirements of Directive 2008/57/EC and may therefore be used for the assessment of the subsystem.

Article 8

The declaration of verification and/or conformity to type of a new vehicle established in accordance with Decision 2011/229/EU shall be considered valid:

— for locomotives, EMUs, DMUs and coaches until the type or design certificate needs to be renewed as stated in Decision 2011/291/EU for cases where the latter decision was applied, or until 31 May 2017 for other cases,

— for wagons until 13 April 2016.

The declaration of verification and/or conformity to type of a new vehicle established in accordance with Decision 2008/232/EC shall be considered valid until the type or design certificate needs to be renewed as stated in this Decision.

[1] Directive 2003/10/EC of the European Parliament and of the Council of 6 February 2003 on the minimum health and safety requirements regarding the exposure of workers to the risks arising from physical agents (noise) (Seventeenth individual Directive within the meaning of Article 16(1) of Directive 89/391/EEC) (OJ L 42, 15.2.2003, p. 38).

Article 9

1. Decision 2011/229/EU is repealed with effect from 1 January 2015.

2. In the Annex to Decision 2008/232/EC, points 4.2.6.5, 4.2.7.6 and 7.3.2.15 are deleted with effect from 1 January 2015.

3. The provisions referred to in paragraphs 1 and 2 shall however continue to apply in relation to projects authorised in accordance with the TSI annexed to those Decisions and, unless the applicant requests to apply this Regulation, to projects relating to new vehicles and to the renewal or upgrading of existing vehicles which are at an advanced stage of development, are the subject of a contract in force on the date of publication of this Regulation or cases referred to in Article 8 of this Regulation.

Article 10

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

It shall apply from 1 January 2015. However, an authorisation for placing into service may be granted in application of the TSI as set out in the Annex to this Regulation, before 1 January 2015.

This Regulation shall be binding in its entirety and directly applicable in the Member States in accordance with the Treaties.

Done at Brussels, 26 November 2014.

For the Commission

The President

Jean-Claude JUNCKER

ANNEX

TABLE OF CONTENTS

1. INTRODUCTION

In general Technical Specifications for Interoperability (TSI) lay down for each subsystem (or part of it) the optimal level of harmonised specifications in order to ensure the interoperability of the rail system. Therefore TSIs harmonise only the specifications concerning parameters which are critical to interoperability (basic parameters). The specifications of the TSIs must meet the essential requirements as set out in Annex III of Directive 2008/57/EC.

In line with the proportionality principle this TSI sets out the optimal level of harmonisation related to specifications on the rolling stock subsystem as defined in Section 1.1 intended to limit the noise emission of the rail system within the Union.

1.1. Technical scope

This TSI applies to all rolling stock within the scope of Regulation (EU) No 1302/2014 (LOC&PAS TSI) and Regulation (EU) No 321/2013 (WAG TSI).

1.2. Geographical scope

The geographical scope of this TSI corresponds to the scopes defined in Section 1.2 of Regulation (EU) No 1302/2014 and in Section 1.2 of Regulation (EU) No 321/2013, each for their rolling stock (RST) concerned.

2. DEFINITION OF THE SUBSYSTEM

A 'unit' means the rolling stock which is subject to the application of this TSI, and therefore subject to the 'EC' verification procedure. Chapter 2 of Regulation (EU) No 1302/2014 and Chapter 2 of Regulation (EU) No 321/2013 describe what a unit can consist of.

The requirements of this TSI apply to the following categories of rolling stock set out in Section 1.2 in Annex I of Directive 2008/57/EC:

(a) *Self-propelling thermal or electric trains*. This category is further defined in Chapter 2 of Regulation (EU) No 1302/2014 and shall be referred to in this TSI as multiple units, EMU (electrified) or DMU (diesel).

(b) *Thermal or electric traction units*. This category is further defined in Chapter 2 of Regulation (EU) No 1302/2014 and shall be referred to in this TSI as locomotives. Power units that form part of a 'self-propelling thermal or electric train' and railcars are not included in this category and belong to the category under point (a).

(c) *Passenger carriages and other related cars*. This category is further defined in Chapter 2 of Regulation (EU) No 1302/2014 and shall be referred to in this TSI as coaches.

(d) *Freight wagons, including vehicles designed to carry lorries*. This category is further defined in Chapter 2 of Regulation (EU) No 321/2013 and shall be referred to in this TSI as wagons.

(e) *Mobile railway infrastructure construction and maintenance equipment*. This category is further defined in Chapter 2 of Regulation (EU) No 1302/2014 and consists of on-track machines (referred to in this TSI as OTMs) and infrastructure inspection vehicles, which belong to the categories in points (a), (b) or (d) depending on their design.

3. ESSENTIAL REQUIREMENTS

All basic parameters set out in this TSI must be linked with at least one of the essential requirements as set out in Annex III of Directive 2008/57/EC. Table 1 indicates the allocation.

Table 1

Basic parameters and their link to the essential requirements

Point	Basic parameter	Essential requirements				
		Safety	Reliability availability	Health	Environm. protection	Technical compat.
4.2.1	Limits for stationary noise				1.4.4	
4.2.2	Limits for starting noise				1.4.4	

Point	Basic parameter	Essential requirements				
		Safety	Reliability availability	Health	Environm. protection	Technical compat.
4.2.3	Limits for pass-by noise				1.4.4	
4.2.4	Limits for driver's cab interior noise				1.4.4	

4. CHARACTERISATION OF THE SUBSYSTEM

4.1. **Introduction**

This Chapter sets out the optimal level of harmonisation related to specifications on the rolling stock subsystem intended to limit the noise emission of the Union rail system and to achieve interoperability.

4.2. **Functional and technical specifications of the subsystems**

The following parameters have been identified as critical for the interoperability (basic parameters):

(a) 'stationary noise';

(b) 'starting noise';

(c) 'pass-by noise';

(d) 'driver's cab interior noise'.

The corresponding functional and technical specifications allocated to the different categories of rolling stock are set out in this section. In case of units equipped with both thermal and electric power the relevant limit values under all normal operation modes shall be respected. If one of these operation modes foresees the use of both thermal and electric power at the same time the less restrictive limit value applies. In accordance with Articles 5(5) and 2(l) of Directive 2008/57/EC, provision may be made for specific cases. Such provisions are indicated in Section 7.3.

The assessment procedures for the requirements in this section are defined in the indicated points and sub points of Chapter 6.

4.2.1. *Limits for stationary noise*

The limit values for the following sound pressure levels under normal vehicle conditions concerning the stationary noise allocated to the categories of the rolling stock subsystem are set out in Table 2:

(a) the A-weighted equivalent continuous sound pressure level of the unit ($L_{pAeq,T[unit]}$);

(b) the A-weighted equivalent continuous sound pressure level at the nearest measuring position i considering the main air compressor ($L^{i}_{pAeq,T}$); and

(c) the AF-weighted sound pressure level at the nearest measuring position i considering impulsive noise of the exhaust valve of the air dryer (L^{i}_{pAFmax}).

The limit values are defined at a distance of 7,5 m from the centre of the track and 1,2 m above top of rail.

Table 2

Limit values for stationary noise

Category of the rolling stock subsystem	$L_{pAeq,T\ [unit]}$ [dB]	$L^{i}_{pAeq,T}$ [dB]	L^{i}_{pAFmax} [dB]
Electric locomotives and OTMs with electric traction	70	75	85
Diesel locomotives and OTMs with diesel traction	71	78	

Category of the rolling stock subsystem	$L_{pAeq,T\ [unit]}$ [dB]	$L^{i}_{pAeq,T}$ [dB]	L^{i}_{pAFmax} [dB]
EMUs	65	68	
DMUs	72	76	
Coaches	64	68	
Wagons	65	n.a.	n.a.

The demonstration of conformity is described in point 6.2.2.1.

4.2.2. *Limits for starting noise*

The limit values for the AF-weighted maximum sound pressure level ($L_{pAF,max}$) concerning the starting noise allocated to the categories of the rolling stock subsystem are set out in Table 3. The limit values are defined at a distance of 7,5 m from the centre of the track and 1,2 m above top of rail.

Table 3

Limit values for starting noise

Category of the rolling stock subsystem	$L_{pAF,max}$ [dB]
Electric locomotives with total tractive power P < 4 500 kW	81
Electric locomotives with total tractive power P ≥ 4 500 kW OTMs with electric traction	84
Diesel locomotives P < 2 000 kW at the engine output shaft	85
Diesel locomotives P ≥ 2 000 kW at the engine output shaft OTMs with diesel traction	87
EMUs with a maximum speed v_{max} < 250 km/h	80
EMUs with a maximum speed v_{max} ≥ 250 km/h	83
DMUs P < 560 kW/engine at the engine output shaft	82
DMUs P ≥ 560 kW/engine at the engine output shaft	83

The demonstration of conformity is described in point 6.2.2.2.

4.2.3. *Limits for pass-by noise*

The limit values for the A-weighted equivalent continuous sound pressure level at a speed of 80 km/h ($L_{pAeq,Tp,(80\ km/h)}$) and, if applicable, at 250 km/h ($L_{pAeq,Tp,(250\ km/h)}$) concerning the pass-by noise allocated to the categories of the rolling stock subsystem are set out in Table 4. The limit values are defined at a distance of 7,5 m from the centre of the track and 1,2 m above top of rail.

Measurements at speeds higher than or equal to 250 km/h shall also be made at the 'additional measurement position' with a height of 3,5 m above top of rail in accordance with Chapter 6 of EN ISO 3095:2013 and assessed against the applicable limit values of Table 4.

Table 4

Limit values for pass-by noise

Category of the rolling stock subsystem	$L_{pAeq,Tp\ (80\ km/h)}$ [dB]	$L_{pAeq,Tp\ (250\ km/h)}$ [dB]
Electric locomotives and OTMs with electric traction	84	99
Diesel locomotives and OTMs with diesel traction	85	n.a.
EMUs	80	95
DMUs	81	96
Coaches	79	n.a.
Wagons (normalised to APL = 0,225) (*)	83	n.a.

(*) APL: the number of axles divided by the length over the buffers (m^{-1})

The demonstration of conformity is described in point 6.2.2.3.

4.2.4. *Limits for the driver's cab interior noise*

The limit values for the A-weighted equivalent continuous sound pressure level ($L_{pAeq,T}$) concerning the noise within the driver's cab of electric and diesel locomotives, OTMs, EMUs, DMUs and coaches fitted with a cab are set out in Table 5. The limit values are defined in the vicinity of the driver's ear.

Table 5

Limit values for driver's cab interior noise

Noise within the driver's cab	$L_{pAeq,T}$ [dB]
At standstill with horns sounding	95
At maximum speed v_{max} if $v_{max} < 250$ km/h	78
At maximum speed v_{max} if 250 km/h ≤ $v_{max} < 350$ km/h	80

The demonstration of conformity is described in point 6.2.2.4.

4.3. **Functional and technical specifications of the interfaces**

This TSI has the following interfaces with the rolling stock subsystem:

Interface with subsystems of points (a), (b), (c) and (e) of Chapter 2 (dealt with in Regulation (EU) No 1302/2014) with regard to:

— stationary noise,

— starting noise (not applicable to coaches),

— pass-by noise,

— interior noise within the driver's cab, where applicable.

Interface with subsystems of point (d) of Chapter 2 (dealt with in Regulation (EU) No 321/2013) with regard to:

— pass-by noise,

— stationary noise.

4.4. **Operating rules**

Requirements concerning the operating rules for the subsystem rolling stock are set out in Section 4.4 of Regulation (EU) No 1302/2014 and in Section 4.4 of Regulation (EU) No 321/2013.

4.5. **Maintenance rules**

Requirements concerning the maintenance rules for the subsystem rolling stock are set out in Section 4.5 of Regulation (EU) No 1302/2014 and in Section 4.5 of Regulation (EU) No 321/2013.

4.6. **Professional qualifications**

Not applicable.

4.7. **Health and safety conditions**

See Article 6 of this Regulation.

4.8. **European register of authorised types of vehicles**

The data of the rolling stock that must be recorded in the 'European register of authorised types of vehicles (ERATV)' are set out in Decision 2011/665/EU.

5. INTEROPERABILITY CONSTITUENTS

There is no interoperability constituent specified in this TSI.

6. CONFORMITY ASSESSMENT AND EC VERIFICATION

6.1. **Interoperability constituents**

Not applicable.

6.2. **Subsystem rolling stock regarding noise emitted by rolling stock**

6.2.1. *Modules*

The EC verification shall be performed in accordance with the module(s) described in Table 6.

Table 6

Modules for EC verification of subsystems

SB	EC-Type Examination
SD	EC verification based on quality management system of the production process
SF	EC verification based on product verification
SH1	EC verification based on full quality management system plus design examination

These modules are specified in detail in Decision 2010/713/EU.

6.2.2. *EC verification procedures*

The applicant shall choose one of the following assessment procedures consisting of one or more modules for the EC verification of the subsystem:

— (SB+SD),

— (SB+SF),

— (SH1).

Within the application of the chosen module or module combination the subsystem shall be assessed against the requirements defined in Section 4.2. If necessary, additional requirements concerning the assessment are given in the following points.

6.2.2.1. Stationary noise

The demonstration of conformity with the limit values on stationary noise as set out in point 4.2.1 shall be carried out in accordance with Sections 5.1, 5.2, 5.3, 5.4, 5.5 (without clause 5.5.2), 5.7 and clause 5.8.1 of EN ISO 3095:2013.

For the assessment of the main air compressor noise at the nearest measuring position i, the $L^{i}_{pAeq,T}$ indicator shall be used with T representative of one operating cycle as defined in Section 5.7 of EN ISO 3095:2013. Only the train systems that are required for the air compressor to run under normal operating conditions shall be used for this. The train systems which are not needed for the operation of the compressor may be switched off to prevent contribution to the noise measurement. The demonstration of conformity with the limit values shall be carried out under the conditions solely necessary for operation of the main air compressor at the lowest rpm.

For the assessment of the impulsive noise sources at the nearest measuring position i, the L^{i}_{pAFmax} indicator shall be used. The relevant noise source is the exhaust from the valves of the air dryer.

6.2.2.2. Starting noise

The demonstration of conformity with the limit values on starting noise as set out in point 4.2.2 shall be carried out in accordance with Chapter 7 (without clause 7.5.1.2) of EN ISO 3095:2013. The maximum level method referring to Section 7.5 of EN ISO 3095:2013 shall apply. Deviating from clause 7.5.3 of EN ISO 3095:2013 the train shall accelerate from standstill up to 30 km/h and then maintain the speed.

In addition the noise shall be measured at a distance of 7,5 m from the centre of the track and a height of 1,2 m above top of rail. The 'averaged level method' and the 'maximum level method' in accordance with Section 7.6 and 7.5 respectively of EN ISO 3095:2013 shall apply and the train shall accelerate from standstill up to 40 km/h and then maintain the speed. The measured values are not assessed against any limit value and shall be recorded in the technical file and communicated to the Agency.

For OTMs the starting procedure shall be performed without additional trailer loads.

6.2.2.3. Pass-by noise

The demonstration of conformity with the limit values on pass-by noise as set out in point 4.2.3 shall be carried out in accordance with points 6.2.2.3.1 and 6.2.2.3.2.

6.2.2.3.1. Test track conditions

The tests shall be performed on a reference track as defined in Section 6.2 of EN ISO 3095:2013.

However, it is permitted to carry out the test on a track that does not comply with the reference track conditions in terms of acoustic rail roughness level and track decay rates as long as the noise levels measured in accordance with point 6.2.2.3.2 do not exceed the limit values set out in point 4.2.3.

The acoustic rail roughness and the decay rates of the test track shall be determined in any case. If the track on which the tests are performed does meet the reference track conditions, the measured noise levels shall be marked 'comparable', otherwise they shall be marked 'non-comparable'. It shall be recorded in the technical file whether the measured noise levels are 'comparable' or 'non-comparable'.

The measured acoustic rail roughness values of the test track remain valid during a period starting 3 months before and ending 3 months after this measurement, provided that during this period no track maintenance has been performed which influences the rail acoustic roughness.

The measured track decay rate values of the test track shall remain valid during a period starting 1 year before and ending 1 year after this measurement, provided that during this period no track maintenance has been performed which influences the track decay rates.

Confirmation shall be provided in the technical file that the track data related to the type's pass-by noise measurement were valid during the day(s) of testing, e.g. by providing the date of last maintenance having an impact on noise.

Furthermore, it is permitted to carry out tests at speeds equal to or higher than 250 km/h on slab tracks. In this case the limit values shall be 2 dB higher than those set out in point 4.2.3.

6.2.2.3.2. Procedure

The tests shall be carried out in accordance with the provision in Sections 6.1, 6.3, 6.4, 6.5, 6.6 and 6.7 (without 6.7.2) of EN ISO 3095:2013. Any comparison against limit values shall be carried out with results rounded to the nearest integer decibel. Any normalisation shall be performed before rounding. The detailed assessment procedure is set out in points 6.2.2.3.2.1, 6.2.2.3.2.2 and 6.2.2.3.2.3.

6.2.2.3.2.1. EMU, DMUs, locomotives and coaches

For EMU, DMUs, locomotives and coaches three classes of maximum operational speed are distinguished:

(1) If the maximum operational speed of the unit is lower than or equal to 80 km/h, the pass-by noise shall be measured at its maximum speed v_{max}. This value shall not exceed the limit value $L_{pAeq,Tp(80\ km/h)}$ as set out in point 4.2.3.

(2) If the maximum operational speed v_{max} of the unit is higher than 80 km/h and lower than 250 km/h, the pass-by noise shall be measured at 80 km/h and at its maximum speed. Both measured pass-by noise values $L_{pAeq,Tp(vtest)}$ shall be normalised to the reference speed of 80 km/h $L_{pAeq,Tp(80\ km/h)}$ using formula (1). The normalised value shall not exceed the limit value $L_{pAeq,Tp(80\ km/h)}$ as set out in point 4.2.3.

Formula (1):

$$L_{pAeq,Tp(80\ km/h)} = L_{pAeq,Tp(vtest)} - 30 * \log (v_{test}/80\ km/h)$$

V_{test} = Actual speed during the measurement

(3) If the maximum operational speed v_{max} of the unit is equal to or higher than 250 km/h, the pass-by noise shall be measured at 80 km/h and at its maximum speed with an upper test speed limit of 320 km/h. The measured pass-by noise value $L_{pAeq,Tp(vtest)}$ at 80 km/h shall be normalised to the reference speed of 80 km/h $L_{pAeq,Tp(80\ km/h)}$ using formula (1). The normalised value shall not exceed the limit value $L_{pAeq,Tp(80\ km/h)}$ as set out in point 4.2.3. The measured pass-by noise value at maximum speed $L_{pAeq,Tp(vtest)}$ shall be normalised to the reference speed of 250 km/h $L_{pAeq,Tp(250\ km/h)}$ using formula (2). The normalised value shall not exceed the limit value $L_{pAeq,Tp(250\ km/h)}$ as set out in point 4.2.3.

Formula (2):

$$L_{pAeq,Tp(250\ km/h)} = L_{pAeq,Tp(vtest)} - 50 * \log(v_{test}/250\ km/h)$$

V_{test} = Actual speed during the measurement

6.2.2.3.2.2. Wagons

For wagons two classes of maximum operational speed are distinguished:

(1) If the maximum operational speed v_{max} of the unit is lower than or equal to 80 km/h, the pass-by noise shall be measured at its maximum speed. The measured pass-by noise value $L_{pAeq,Tp(vtest)}$ shall be normalised to a reference APL of 0,225 m^{-1} $L_{pAeq,Tp\ (APLref)}$ using formula (3). This value shall not exceed the limit value $L_{pAeq,Tp(80\ km/h)}$ as set out in point 4.2.3.

Formula (3):

$$L_{pAeq,Tp\ (APLref)} = L_{pAeq,Tp(vtest)} - 10 * \log(APL_{wag}/0{,}225\ m^{-1})$$

APL_{wag} = Number of axles divided by the length over the buffers [m^{-1}]

V_{test} = Actual speed during the measurement

(2) If the maximum operational speed v_{max} of the unit is higher than 80 km/h, the pass-by noise shall be measured at 80 km/h and at its maximum speed. Both measured pass-by noise values $L_{pAeq,Tp(vtest)}$ shall be normalised to the reference speed of 80 km/h and to a reference APL of 0,225 m^{-1} $L_{pAeq,Tp(APL\ ref,\ 80\ km/h)}$ using formula (4). The normalised value shall not exceed the limit value $L_{pAeq,Tp(80\ km/h)}$ as set out in point 4.2.3.

Formula (4):

$$L_{pAeq,Tp\ (APLref,\ 80\ km/h)} = L_{pAeq,Tp(vtest)} - 10 * \log(APL_{wag}/0{,}225\ m^{-1}) — 30 * \log(v_{test}/80\ km/h)$$

APL_{wag} = Number of axles divided by the length over the buffers [m^{-1}]

V_{test} = Actual speed during the measurement

6.2.2.3.2.3. OTMs

For OTMs the same assessment procedure as set out in 6.2.2.3.2.1 applies. The measuring procedure shall be performed without additional trailer loads.

OTMs are deemed to comply with the pass-by noise level requirements in point 4.2.3 without measuring when they are:

— solely braked by either composite brake blocks or disc brakes, and

— equipped with composite scrubbers, if scrubber blocks are fitted.

6.2.2.4. Driver's cab interior noise

The demonstration of conformity with the limit values on the driver's cab interior noise as set out in point 4.2.4 shall be carried out in accordance with EN 15892:2011. For OTMs the measuring procedure shall be performed without additional trailer loads.

6.2.3. *Simplified evaluation*

Instead of the test procedures as set out in point 6.2.2, it is permitted to substitute some or all of the tests by a simplified evaluation. The simplified evaluation consists of acoustically comparing the unit under assessment to an existing type (further referred to as the reference type) with documented noise characteristics.

The simplified evaluation may be used for each of the applicable basic parameters 'stationary noise', 'starting noise', 'pass-by noise' and 'driver's cab interior noise' autonomously and shall consist of providing evidence that the effects of the differences of the unit under assessment do not result in exceeding the limit values set out in Section 4.2.

For the units under simplified evaluation, the proof of conformity shall include a detailed description of the noise relevant changes compared to the reference type. From this description, a simplified evaluation shall be performed. The estimated noise values shall include the uncertainties of the applied evaluation method. The simplified evaluation can either be a calculation and/or simplified measurement.

A unit certified on the basis of the simplified evaluation method shall not be used as a reference unit for a further evaluation.

If the simplified evaluation is applied for pass-by noise, the reference-type shall comply with at least one of the following:

— Chapter 4 and for which the pass-by noise results are marked 'comparable'

— Chapter 4 of Decision 2011/229/EU and for which the pass-by noise results are marked 'comparable'

— Chapter 4 of Decision 2006/66/EC

— Chapter 4 of Decision 2008/232/EC.

In case of a wagon whose parameters remain, compared to the reference type, within the permitted range of Table 7 it is deemed without further verification that the unit complies with the limit values on pass-by noise as set out in point 4.2.3.

Table 7

Permitted variation of wagons for the exemption from verification

Parameter	Permitted variation (compared to the reference unit)
Max. unit speed	Any speed up to 160 km/h
Type of wheel	Only if equally or less noisy (acoustic characterisation i. a. w. Annex E of EN 13979-1:2011)
Tare weight	Only within the range of +20 %/- 5 %
Brake block	Only if variation does not result in higher noise emission.

7. IMPLEMENTATION

7.1. **Application of this TSI to new subsystems**

See Article 8 of this Regulation.

7.2. **Application of this TSI to renewed and upgraded subsystems**

If a Member State considers that in accordance with Article 20(1) of Directive 2008/57/EC a new authorisation for placing in service is necessary, the applicant shall demonstrate that the noise levels of renewed or upgraded units remain below the limits set out in the TSI which was applicable when the unit in question was first authorised. If no TSI existed at the time of the first authorisation, it shall be demonstrated that the noise levels of renewed or upgraded units are either not increased or remain below the limits set out in Decision 2006/66/EC or Decision 2002/735/EC.

The demonstration shall be limited to the basic parameters affected by the renewal/upgrade.

If the simplified evaluation is applied, the original unit may represent the reference unit in accordance with the provisions of point 6.2.3.

The replacement of a whole unit or (a) vehicle(s) within a unit (e.g. a replacement after a severe damage) does not require a conformity assessment against this TSI, as long as the unit or the vehicle(s) are identical to the ones they replace.

If, during renewal or upgrading of a wagon, a wagon is being equipped with composite brake blocks and no noise sources are added to the wagon under assessment, then it shall be assumed that the requirements of point 4.2.3 are met without further testing.

7.3. **Specific cases**

7.3.1. *Introduction*

The specific cases, as listed in point 7.3.2, are classified as

(a) 'P' cases: 'permanent' cases;

(b) 'T' cases: 'temporary' cases.

7.3.2. *List of specific cases*

7.3.2.1. General specific case

Specific case Estonia, Finland, Latvia and Lithuania

('P') For units from third countries with 1 520mm wheel set gauge the application of national technical rules instead of the requirements in this TSI is permitted.

7.3.2.2. Limits for stationary noise (point 4.2.1)

(a) Specific case Finland

('T') For coaches and wagons equipped with a diesel generator for electrical power supply higher than 100 kW and intended to operate solely on the railway network of Finland the limit value for stationary noise $L_{pAeq,T\ [unit]}$ in Table 2 may be raised up to 72 dB.

Decision 2011/229/EU may continue to be applied for freight wagons to be used only on the territory of Finland and until the relevant technical solution in relation to Nordic winter conditions is found, but in any case not later than until 31 December 2017. This shall not prevent freight wagons from other Member States to operate on the Finnish network.

(b) Specific case UK for Great Britain

('P') For DMUs intended to operate solely on the railway network of Great Britain the limit value for stationary noise $L_{pAeq,T\ [unit]}$ in Table 2 may be raised up to 77 dB.

This specific case does not apply to DMUs intended to operate solely on the High Speed 1 railway network.

(c) Specific case UK for Great Britain

('T') For units intended to operate solely on the railway network of Great Britain the limit values $L^{i}_{pAeq,T}$ in Table 2 considering the main air compressor do not apply. The measured values shall be submitted to the NSA UK.

This specific case does not apply to units intended to operate solely on the High Speed 1 railway network.

7.3.2.3. Limits for starting noise (point 4.2.2)

(a) Specific case Sweden

('T') For locomotives with total tractive power of more than 6 000 kW and a maximum axle load of more than 25 t the limit values for starting noise $L_{pAF,max}$ in Table 3 may be raised up to 89 dB.

(b) Specific case UK for Great Britain

('P') For units specified in Table 8 intended to operate solely on the railway network of Great Britain the limit value for starting noise $L_{pAF,max}$ in Table 3 may be raised up to the values set out in Table 8.

Table 8

Limit values for starting noise regarding a specific case UK for Great Britain

Category of the rolling stock subsystem	$L_{pAF,max}$ [dB]
Electric locomotives with total tractive power P < 4 500 kW	83
Diesel locomotives P < 2 000 kW at the engine output shaft	89
DMUs	85

This specific case does not apply to units intended to operate solely on the High Speed 1 railway network.

7.3.2.4. Limits for pass-by noise (point 4.2.3)

(a) Specific case Sweden

('T') For locomotives with total tractive power of more than 6 000 kW and a maximum axle load of more than 25 t the limit values for pass-by noise $L_{pAeq,Tp\ (80\ km/h)}$ in Table 4 may be raised up to 85 dB.

Appendix A

Open points

This TSI does not contain any open points

Appendix B

Standards referred to in this TSI

TSI		Standard	
Characteristics to be assessed		References to mandatory standards	Chapter
Stationary noise	4.2.1	—	—
	6.2.2.1	EN ISO 3095:2013	5
Starting noise	4.2.2	—	—
	6.2.2.2	EN ISO 3095:2013	7
Pass-by noise	4.2.3	EN ISO 3095:2013	6
	6.2.2.3	EN ISO 3095:2013	6
Driver's cab interior noise	4.2.4	—	—
	6.2.2.4	EN 15892:2011	all
Simplified evaluation	6.2.3	EN 13979-1:2011	Annex E

Appendix C

Assessment of the rolling stock subsystem

Characteristics to be assessed, as specified in Section 4.2					Particular assessment procedure
Element of the rolling stock sub-system	Point	Design review	Type Test	Routine Test	Point
Stationary noise	4.2.1	X (*)	X	n.a.	6.2.2.1
Starting noise	4.2.2	X (*)	X	n.a.	6.2.2.2
Pass-by noise	4.2.3	X (*)	X	n.a.	6.2.2.3
Driver's cab interior noise	4.2.4	X (*)	X	n.a.	6.2.2.4

(*) Only if the simplified evaluation in accordance with point 6.2.3 is applied.