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ACCOMPANYING REPORT TO THE OPINION OF THE EUROPEAN UNION AGENCY FOR RAILWAYS

for

THE EUROPEAN COMMISSION

regarding

Technical documents of the TAP TSI concerning ticketing

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1. Executive summary

The report is the accompanying report for the opinion ERA-OPI-2023-4 concerning the technical documents for ticketing, annexed to the regulation (EU) 454/2011 Telematics applications for passengers (TAP TSI).

The opinion addresses the question if the following technical documents for ticketing

- Technical document B.6 - Electronic seat/berth reservation and electronic production of transport documents - transport documents (RCT2 standard)
- Technical document B.7 - International Rail Ticket for home printing

can be replaced by the updated technical documents B.11 and B.12, to take into account the new developments for ticketing.

The background of this question is the revision of the TAP TSI, which took place in 2017 – 2019. During this revision the technical documents for ticketing were updated to accommodate additional requirements for the new ticketing methods and as well new technical solutions for ticketing.

The recommendation is today - June 2023 - still pending and not yet approved by the European Commission and the Railway interoperability and safety committee (RISC). Nevertheless the technical document are already in implementation in the rail sector. The railway stakeholders support therefore the solution to make the updated technical documents for ticketing legally applicable, until the recommendation ERA-REC-122 is accepted.

The report explains the background and reasons for the publication of the opinion.

2. Introduction

The accompanying report complements the opinion ERA-OPI-2023-4 to explain the background of the opinion and the analysis, why the technical document for ticketing B.6 and B.7 can be replaced by the updated version B.11 and B.12.

The request for the opinion has been submitted by the European commission on 06.04.2023 to ERA. The commission requested the agency to analyse the ERA Technical Opinion with regards to the TAP TSI technical documents for ticketing for ERA if the new proposed technical documents B.11 and B.12 can be accepted as replacement for the existing TAP TSI technical documents B.6 and B.7.

The legal base for the recommendation is the Article 10 (2) of the REGULATION (EU) 2016/796 OF THE EUROPEAN PARLIAMENT AND OF THE COUNCIL of 11 May 2016 on the European Union Agency for Railways and repealing Regulation (EC) No 881/2004. This article allows that *“The Agency shall issue opinions at the request of the Commission on amendments to any act adopted on the basis of Directive (EU) 2016/797 or Directive (EU) 2016/798, especially where any alleged deficiency is signalled.”*

3. Context

3.1. Subject and technical scope

The subject of this opinion is the update of the technical documents for ticketing, attached to the TAP TSI. The affected documents are the technical document

- B.6 - Electronic seat/berth reservation and electronic production of transport documents - transport documents (RCT2 standard)
- B.7 - International Rail Ticket for home printing

The opinion analyses, if the documents above can be replaced by the updated technical documents B.11 and B.12.

3.2. Technical background of the TAP TSI revision 2017 - 2019

The European commission published on 8 June 2017 the supplementing Directive (EU) 2016/797 with specific objectives for the drafting, adoption and review of technical specifications for interoperability. The document defined in detail the tasks to be elaborated by ERA concerning the revision of the TAP TSI and mandated ERA for this revision.

Based on this Directive, ERA has revised the regulation “(EU) 454/2011 Telematics applications for passenger services (TAP TSI)” in 2017-2019. One of the important topics in the revision was the update of the ticketing technical documents to provide new ticketing methods and to use standards, which are better adapted to technical needs.

The main topics for the discussion concerning interoperable ticketing were:

- 4.2.10. Standard for the handling of security elements for product distribution
- 4.2.11.2 Standard for European ‘Ticket On Departure’ and for European ‘Manifest On List’
- 4.2.11.3 Technical document or standard on direct fulfilment methods which are linked to the ticket and/or reservation and to the kind of media for domestic sales
- 4.2.11.4 Technical document or standard on indirect fulfilment methods which are linked to the ticket and/or reservation and to the kind of media for domestic sales

The technical documents for ticketing have been therefore replaced by completely reworked technical documents. The updated documents have been attached to the recommendation ERA-REC-122, submitted on 10 January 2020 to the European Commission and published on ERA website¹.

3.1. Closing of open points of the TAP TSI

The regulation TAP TSI contains in ANNEX II a list of open points. Those open points were addressed during the drafting phase of the TAP TSI in 2007 - 2010, but could not be covered by technical standards, which were not available at this time. The following table shows those open points from the annex II of the TAP TSI:

Table 1: List of open points of the TAP TSI

<i>Section</i>	<i>Open points</i>
4.2.2.1.	Technical document on the process and the information used for it in respect of tariff data intended for domestic sales
4.2.10.	Standard for the handling of security elements for product distribution
4.2.11.2	Standard for European ‘Ticket On Departure’ and for European ‘Manifest On List’
4.2.11.3	Technical document or standard on direct fulfilment methods which are linked to the ticket and/or reservation and to the kind of media for domestic sales
4.2.11.4	Technical document or standard on indirect fulfilment methods which are linked to the ticket and/or reservation and to the kind of media for domestic sales
4.2.22	Standard for the exchange of fare information in the context of connection with other modes of transport

ERA has submitted for each of the open points a solution proposal, explaining how to close them. The solution proposals were based mainly on available European standards for the tariff data exchange and for the interoperable ticketing.

3.1.1. New technical documents for ticketing

The recommendation addresses – among others – the further development of the interoperable international and domestic ticketing for rail. ERA has proposed in the recommendation ERA-REC-122 to replace the existing technical documents for international and domestic ticketing by new documents. For this purpose existing technical documents B.6 and B.7 and additional input from the working party have been

¹ https://www.era.europa.eu/content/recommendation-era-rec-122-european-union-agency-railways-technical-specification_en

used to create new technical documents, covering international and domestic ticketing. Due to large restructuring of the content, the technical documents for ticketing have been re-created with new reference numbers and a completely changed content. The draft documents are available on ERA extranet:

- [Technical Document - B11 - LAYOUT FOR ELECTRONICALLY ISSUED RAIL PASSENGER TICKETS](#)
- [Technical Document - B12 - DIGITAL SECURITY ELEMENTS FOR RAIL PASSENGER TICKETING](#)

The updated technical documents B.11 and B.12 covering international and domestic ticketing based on barcodes and as e-ticket and are backward compatible with the existing technical documents B.6 and B.7 of the TAP TSI.

The recommendation ERA-REC-122, submitted by ERA on 10 January 2020, has not yet been approved by the European Commission and by the member states in the Rail interoperability and Safety Committee (RISC). Due to the pending recommendation, the technical document B.11. and B.12 are not yet legally applicable for the implementation of the TAP TSI. Nevertheless the technical documents have a certain value for the railway sector and are already in use to implement ticketing solutions. To avoid that the implementations are Therefore it would be helpful if the documents are legally binding and as replacement of the existing technical documents B.6 and B.7.

4. Analysis

4.1. Methodology of the analysis

The chapter explains the methodology has been used to analyse the documents and the impact on the change.

The key problem of the analysis of this change is, that the technical documents have been modified together with the basic parameters concerning ticketing of the TAP TSI. For instance the TAP TSI basic parameters for ticketing have been revised to take into account not only the requirements linked with the international ticketing, but as well the requirements for the domestic ticketing. The following basic parameters have been modified in the recommendation ERA-REC-122, by replacing the technical documents B.6 and B.7 with the updated technical documents B.11 and B.12 for ticketing:

- › 4.2.11.1. Fulfilment - direct - for international and foreign sales
- › 4.2.11.2. Fulfilment - indirect - for international and foreign sales
- › 4.2.11.3. Fulfilment – direct – domestic sales
- › 4.2.11.4. Fulfilment – indirect – domestic sales

The change of the basic parameters of the TAP TSI is not in scope of this opinion. The main question of the analysis is, if the unmodified legal text of the regulation (EU) 454/2011 is compatible with the upgraded technical documents for these basic parameters.

The following methodology has been used for the analysis:

1. Comparison of the technical documents
The technical documents have been compared, if all requirements from the technical documents B.6 and B.7 are available as well in the restructured technical documents B.11 and B.12. This method shall ensure, that existing necessary requirements of the technical document were not removed during the change of the content.
2. Analysis of the new content introduced in the technical documents B.11 and B.12
In the technical documents B.11 and B.12 have been enriched with additional functions concerning ticketing. This analysis shall show that the new requirements can be used, even if the regulation (EU) 454/2011 remains unchanged.

The updated technical documents have been composed largely of the existing content of both preceding technical documents B.6 and B.7. Whereas the technical documents B.6 and B.7 were created based on the underpinning media, security paper and plain paper, the updated technical documents B.11 and B.12 are

based on the functions. Therefore the document comparison has been done on the technical documents B.11 and B.12 as references.

4.1.1. Closing of open points for ticketing during the revision of the TAP TSI

The open points for ticketing in the TAP TSI comprising the following ones:

Table 2: List of open points for ticketing of the TAP TSI

4.2.11.2	Standard for European 'Ticket On Departure' and for European 'Manifest On List'
4.2.11.3	Technical document or standard on direct fulfilment methods which are linked to the ticket and/or reservation and to the kind of media for domestic sales
4.2.11.4	Technical document or standard on indirect fulfilment methods which are linked to the ticket and/or reservation and to the kind of media for domestic sales

Indirect fulfilment methods were already covered in the TAP TSI in the basic parameter 4.2.11.2. Fulfilment — indirect — for international and foreign sales. This basic parameter is further specified by the TAP TSI technical document B.7, based on the UIC leaflet 918-3. The rights for publication and modification of the UIC leaflets 918-1, 918-2 and 918-3 concerning standards for international ticketing were purchased in 2009 by ERA. Beside of their publication as UIC-leaflet, they are available as well as TAP TSI technical documents B.5, B.6 and B.7. The maintenance of these documents – e.g. the management of changes - is subject to an agreement between ERA and UIC.

The leaflets UIC 918-2 and 918-3 have been restructured and the content has been put into two new UIC-leaflets 918-8 and 918-9, repealing the leaflets 918-2 and 918-3. Additionally UIC has modified the UIC leaflet 918-1, adding new functions supporting e-ticketing. Chapters, essential to ensure interoperability, of the UIC leaflets 918-1, 918-2 and 918-3 are equivalent to the TAP TSI technical document B.5, B.6 and B.7 concerning ticketing. Due to the reshuffling of the content of the UIC-leaflets 918-2 and 918-3 into new UIC leaflets, it has been proposed by ERA to create two new ERA technical documents and repeal the existing TAP TSI technical documents B.6 and B.7.

The working party agreed with this proposal. ERA created two new technical documents B.11 - Layout for electronically issued rail passenger tickets and B.12 - Digital security elements for rail passenger ticketing. The document B.11 covers the layout of the tickets for different media (e.g. security paper, plain paper, mobile phone screen) whereas the technical document B.12 describes the security element handling of those tickets. The technical documents have been revised and accepted by the working party.

For the open points above technical solutions were found and integrated into the recommendation. For the purpose of interoperable ticketing two new technical documents were created and attached to the TAP TSI:

- the technical document B.11
- the technical document B.12

Both documents are backwards compatible to the existing technical documents B.6 and B.7, covering international ticketing. The main difference between that these technical documents are built on the media, where the tickets are issued:

- B.6 for security paper tickets according to RCT2 format
- B.7 for home printed tickets.

The new technical documents B.11 and B.12 are created based on the supported features of tickets independently from the media used:

- B.11 for the layout of the tickets covering RCT2 tickets, Rail credit card size ticket, A4 rail ticket, Flexible size ticket
- B.12 for the security elements to be printed on the tickets, covering the security mechanisms to secure the tickets, the exchange mechanisms for the keys and the different barcode types used for ticketing (e.g. AZTEC, PDF417) and the data stored in the barcode

The technical documents B.6 and B.7 have been removed consequently from the annex of the TAP TSI.

4.1.2. Analysis of technical document B.11 vs B.6 and B.7

The technical document “B.11 - Layout for electronically issued rail passenger tickets” is composed by the original content of both technical documents B.6 and B.7. Additionally new elements, such as new ticket media (e.g. smartphone screens) were introduced in the document:

Table 3: Comparison of technical document B.11 with B.6 and B.7

<i>Chapter in technical document B.11</i>	<i>Corresponding chapter in technical document B.6</i>	<i>Corresponding chapter in technical document B.7</i>
Rail Combined Ticket 2 (RCT2)	3 Rail Combined Ticket 2 (RCT2)	Not covered
Rail Credit Card Sized Ticket (RCCST)	Not covered	Not covered
A4 Rail Ticket (A4RT)	Not covered	3 - Layout
Flexible Size Ticket (FST)	Not covered	Not covered

The both chapters “Rail Credit Card Sized Ticket (RCCST)” and “Flexible Size Ticket (FST)” are covering new requirements for new introduced ticket media. They can be counted as “Enhancements”.

4.1.3. Analysis of technical document B.12 vs. B.6 and B.7

The technical document “B.12 - Digital security elements for rail passenger ticketing” is composed of the content of both technical documents B.6 and B.7. Additionally new security elements were introduced in the documents. Furthermore some outdated chapters were removed from the technical document:

Table 4: Comparison of technical document B.12 with B.6 and B.7

<i>Chapter in technical document B.12</i>	<i>Corresponding chapter in technical document B.6</i>	<i>Corresponding chapter in technical document B.7</i>
1. Summary - relation with other leaflets	Not covered	Not covered
2. Generalities about Security Elements in Ticketing	Not covered	Not covered
3. Transformation of data elements into barcodes	Not covered	8 Specification of Digitally Signed Ticket (DST)
4. General Mechanism for creating security elements	Not covered	8 Specification of Digitally Signed Ticket (DST)
5. Hash Code generation - "signature" / "encrypted seal"	C.1.2 - Hash Code generation	Not covered
6. Different barcodes, used in international ticketing	Appendix C - Barcode generation	Not covered
7. SSB – Small Structured Barcode	Appendix C - Barcode generation	Not covered
8. ELB - Element List Barcode	Appendix C - Barcode generation	Not covered
10. TLB - Ticket Layout Barcode - detailed description	Not covered	8 Specification of Digitally Signed Ticket (DST)
11. FCB - Flexible Content Barcode - detailed description	New chapter in B.12	New chapter in B.12
15. Appendix B – SSB – old version	Appendix C - Barcode generation	Not covered

4.2. Impact assessment

This opinion is related to the recommendation ERA-REC-122. The changes of the technical document shall be The approach for the impact assessment of the opinion is therefore to use the impact assessment of the recommendation ERA-REC-122.

The approach of the impact assessment of the TAP TSI revision has been presented in the 6th meeting of the TAP TSI revision working party. The impact assessment is focusing on new TAP TSI basic parameters proposed in the recommendation.

For the impact assessment the following classification of the change requests has been prepared:

- › Error correction – no impact assessment needed: in this case the change request corrected an error
- › Impact negligible: only minor changes in the TAP TSI core text with negligible economic impact.
- › Impact assessment covered by another TSI: The impact assessment has been already executed for another TSI
- › Impact assessment: An impact assessment has been executed for the change request.

For the corresponding change requests concerning the ticketing, the following classification has been chosen.

Table 5: Classification of the changes for the impact assessment

<i>id</i>	<i>Headline</i>	<i>Impact assessment necessary</i>
CR 14	Closing of the open point "4.2.11.4 Technical document or standard on indirect fulfilment methods which are linked to the ticket and/or reservation and to the kind of media for domestic sales"	The setup of the public-key-infrastructure was subject to an impact assessment.
CR 15	Closing of the open point "4.2.10 Standard for the handling of security elements for product distribution" - fulfilment as mobile ticket	The setup of the public-key-infrastructure was subject to an impact assessment.
CR 21	Closing of the open point "4.2.11.3 - Technical document or standard on direct fulfilment methods which are linked to the ticket and/or reservation and to the kind of media for domestic sales" - fulfilment of domestic tickets	The basic parameter proposes the voluntary usage of the TAP TSI technical documents for ticketing. Impact negligible

The impact assessment for the revision of the TAP TSI has been focused on the following two change requests in order to assess potential options for solutions and to identify the best option:

- › CR 15 Closing of the open point "4.2.10 Standard for the handling of security elements for product distribution" - fulfilment as mobile ticket

The documents are available as separate annex [4].

The public-key-infrastructure is not yet covered in the regulation (EU) 454/2011. Therefore the impact assessment for this specific question is not relevant for the opinion.

5. Conclusions

5.1. Main conclusions

The conclusion of the opinion is that the technical document B.5, B.6 and B.7 can be replaced by the new drafted technical documents B.11 and B.12.

6. Opinion

The Agency considers that the TAP TSI technical documents:

- B.11 - Layout for electronically issued rail passenger tickets
- B.12 - Digital security elements for rail passenger ticketing

can be used to provide interoperable ticketing for railways in EU. This can be achieved by replacing the TAP TSI technical documents “B.6 - Electronic seat/berth reservation and electronic production of transport documents - transport documents (RCT2 standard)” and “B.7 - International Rail Ticket for home printing” with the technical documents B.11 and B.12.

The Agency considers that the TAP TSI should be updated with these both technical documents to reflect the most recent technical developments concerning ticketing, as recommended in the recommendation ERA-REC-122.

The following amendments are proposed:

- › Change of the Annex III of Commission Regulation (EU) No 454/2011 (TAP TSI)

ANNEX III – LIST OF TECHNICAL DOCUMENTS REFERENCED IN THIS TSI

Reference	Label
B.1.	Computer generation and exchange of tariff data meant for international or foreign sales – NRT tickets
B.2.	Computer generation and exchange of tariff data meant for international and foreign sales – Integrated Reservation Tickets (IRT)
B.3.	Computer generation and exchange of data meant for international or foreign sales – Special offers
B.4.	Implementation guide for EDIFACT messages covering timetable data exchange
B.5.	Electronic reservation of seats/berths and electronic production of travel documents - Exchange of messages
B.8	Standard numerical coding for railway undertakings, infrastructure managers and other companies involved in rail-transport chains
B.9	Standard numerical coding of locations
B.10	Electronic reservation of assistance for persons with reduced mobility - Exchange of messages
B.11	Layout for electronically issued rail passenger tickets
B.12	Digital security elements for rail passenger ticketing

The updated technical documents B.11 and B.12 shall be published on the website of the Agency, if the opinion is accepted.

Annex 1: Abbreviations**Abbreviations****Table 6: Table of abbreviations**

<i>Abbreviation</i>	<i>Definition</i>
ERA	European Union Agency for Railways
UIC	International Union of Railways

Annex 2: Reference documents**Table 2: Table of reference documents**

<i>Ref N°</i>	<i>Title</i>	<i>Reference</i>	<i>Version</i>
1	Email to the Agency concerning "ERA TO of technical documents for ticketing"	EC request	06.04.2023
2	ANNEX B.11 - LAYOUT FOR ELECTRONICALLY ISSUED RAIL PASSENGER TICKETS		2.0
3	ANNEX B.12 - DIGITAL SECURITY ELEMENTS FOR RAIL PASSENGER TICKETING		2.0
4	Light Impact Assessment TAP Revision 2019/20 – Closure of Open Point Chapter 4.2.10 related to Public Key Infrastructure	ERA-REC-122-IA-PKI	23/09/2019

Annex 3: Reference legislation**Table 3: Table of reference legislation**

<i>Ref N°</i>	<i>Title</i>	<i>Reference</i>	<i>Version</i>
1	Regulation (EU) 2016/796 of the European Parliament and of the Council of 11 May 2016 on the European Union Agency for Railways and repealing Regulation (EC) No 881/2004	OJ L 138, 26.5.2016, p. 1.	N.A.
2	Directive (EU) 2016/798 of the European Parliament and of the Council of 11 May 2016 on railway safety (Recast)	OJ L 138, 26.5.2016, p.102	N.A.
3	Directive (EU) 2016/797 of the European Parliament and of the Council of 11 May 2016 on the interoperability of the rail system (Recast)	OJ L 138, 26.5.2016, p. 44.	N.A.