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OPINION

OPI-2026-3

OF THE EUROPEAN UNION AGENCY FOR RAILWAYS

for

THE EUROPEAN COMMISSION

regarding

a request for non-application of CCS TSI for the radio system to be
used for ETCS data communication by Finland (DC2025-FI-22)

Disclaimer:

The present document is a non-legally binding opinion of the European Union Agency for Railways. It does not represent the view of other EU institutions and bodies, and is without prejudice to the decision-making processes foreseen by the applicable EU legislation. Furthermore, a binding interpretation of EU law is the sole competence of the Court of Justice of the European Union.

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1. General Context

1.1. European Commission's request and scope of this technical opinion

The European Union Agency for Railways (hereinafter “the Agency” or “ERA”) received a request from the European Commission (“EC” or “the Commission”) for a technical opinion pursuant to Article 19(1)(e) Agency Regulation regarding the non-application request DC2025-FI-22, referenced (Ares(2025)1140058919/12/2025)). For convenience, the request is included in ANNEX 1.

The request is related to the following: On 21 May 2025 (Ares(2025)4084798), Finland submitted to the Commission a request in accordance with Article 7(4) Directive (EU) 2016/797 for non-application Commission implementing Regulation (EU) 2016/919 as amended by (EU) 2019/776, 2020/387 and 2020/420 on the EKA pilot line section, and Commission Implementing Regulation (EU) 2023/1695 on the rest of the network and the existing rolling stock.

Finland (FI) wishes to install ETCS Baseline 4 SV 2.2 (trackside and on-board) in conjunction with a pre-FRMCS radio version in the whole network and in the FI existing rolling stock fleet. The non-application request is related to the installation of a radio communication system, called pre-FRMCS system, instead of GSM-R, for carrying out ETCS Level 2 data.

In its request, the European Commission seeks for answers to specific questions related to the pre-FRMCS solution, its compatibility with current and future TSIs, its upgradability to future FRMCS as well as the compatibility with the TSI of the interfaces between the ETCS solution and the pre-FRMCS solution. The specific questions are listed (together with ERA answers) in section 4.3 of this document as well as in ANNEX 1.

The European Commission has not requested a technical assessment of the suitability of the proposed pre-FRMCS solution.

Besides, ERA considers that an Impact Assessment from an economic point of view is not needed because of the following reasons:

- For Finland, as the request for non-application is based on economic reasons, Finland has already provided an economic justification in [4] and [34]; and there is no need for additional assessments by ERA on this matter.
- For other EU Member States, there is no impact as there are no connections between Finland's network and other Member States networks and there will not be border crossing traffic in the short/medium term.

It is important also to underline that EC and ERA are dealing in parallel with the process for the current Technical Opinion and for the assessment (pursuant Article 25(1) of ERA Regulation) of the notified draft national technical rules for the pre-FRMCS solution (pursuant to Article 14(4) and Article 14(5) of Directive (EU) 2016/797). Both processes are intertwined and have dependencies.

European Commission and ERA held meetings with Finland stakeholders (Traficom (NSA FI), Finnish transport infrastructure agency (IM FI), FI Transport Ministry) and requested clarifications and additional information along the past months, that have resulted in the completion of the file for the request for non-application by 31/03/2026.

Notably, the following exchanges for information have taken place:

1. Request for Non-application from Finland and first version of the dossier: (Ares(2025)4084798)-21/05/2025. This dossier comprised the main document, Form B [4], and annexes 1[5], 2[6], 3[7], 4[8] of the file and annex 9[20]. Some technical annexes were missing.
2. Finland sent the missing technical annexes 5 [11], 6 [14], 7 [16] and 8 [18] in July 2025, registered in ARES(2025)9260852 -16/09/2025.

3. On 01/10/2025 the European Commission asked additional information concerning Finland's request for non-application (ARES (2025)8278636 DC2025-FI-22) (24) Finland replied on the 29/10/2025 (ARES (2025)9260852) [25].
4. ERA and Finland (NSA FI and IM FI) held a Teams meeting on the 02/12/2025 in which Finland explains the scope of the request for non-application and ERA asked some questions related to the non-application request and the technical solution for pre-FRMCS.
5. Finland (NSA FI, IM FI, FI Transport Ministry), EC and ERA held a Teams meeting on 03/02/2026 in which the whole process and timeline for the non-application request and the notification to the draft NTRs and the subsequent steps towards the EC Decision on the non-application request are clarified.
6. Finland notified draft national technical rule for pre-FRMCS trackside in SRD on the 12/02/2026 [26].
7. Finland notified draft national technical rule for pre-FRMCS trackside in RDD on the 18/02/2026 [27].
8. Request for further information on 06/03/2026 and on 16/03/2026; registered-Ares(2026)28/10532 [31], in which EC and ERA asked questions about pre-FRMCS solution, its upgradeability to full FRMCS and about the compatibility with the different ETCS system versions. Finland replied on the 31/03/2026-Ares(2026)3406243 [34].

1.2. Request for non-application of TSI from Finland

Traficom, the Finish NSA, by means of a letter referenced Ares (2025)4084798-21/05/2025, requested non-application of the technical specification for interoperability related to the control-command and signaling subsystems of the rail system in the European Union according to the Article 7.1.c. Directive (EU) 2016/797 for Pre-FRMCS project for the EKA pilot line and the rest of Finland's 1524-gauge railway network and existing rolling stock.

1.2.1. Scope of the non-application request from Finland

The scope of the non-application request from Finland is explained in the document [3] and in the accompanying dossier listed in ANNEX 2 Form B [4]:

“Finland has decided that ETCS will be implemented in Finland using the ETCS Level 2 system. ETCS Level 2 requires a reliable communication system. For the reasons described below, the solution chosen is to equip the Finnish rail network and existing rolling stock with a pre-FRMCS data radio solution that utilizes commercial radio networks. The infrastructure manager is responsible for the procurement and interoperability of the trackside and rolling stock equipment required by pre-FRMCS in the required 4G/5G frequency bands. The owner/keeper of the rolling stock is responsible for the installation of the rolling stock equipment.”

1.2.1.1. Geographical scope

The pre-FRMCS solution will be installed in the first place in the EKA pilot section (approx. 190 km) where the equipment of the track and the functionality of the system will be tested before it is expanded to the entire Finnish rail network. Pre-FRMCS still relies mainly on the 4G network on the EKA section but uses the 5G network whenever possible. The deployment of pre-FRMCS is planned to be implemented on the EKA section of the track by Q2/2027.

In the second phase, the implementation of pre-FRMCS will continue in 2028, with deployment continuing for the entire rail network (approx. 6.000 km) until 2040. In this phase, for the entire rail network, pre-FRMCS solution will mainly rely on the 5G network but will use the 4G network to ensure connections when needed.

This is described in ANNEX 2 [24].

1.2.1.2. Rolling stock

The introduction of the pre-FRMCS system applies to existing rolling stock (locomotives and multiple unit trains) actually running on the Finnish 1524 mm rail gauge network and to rolling stock to be procured before FRMCS becomes available. At this stage, the intention is not to equip the special vehicles in accordance with this derogation. New rolling stock entering the market is not subject to the requirements.

More detailed information on the rolling stock in scope is provided in ANNEX 2 [6].

1.2.2. The context in Finland

- Currently in Finland, GSM-R is not in use anymore. The current Voice system is based on TETRA network that is expected to be upgraded in the coming years. The deployment of this TETRA system was subject to a previous Derogation granted to Finland (The derogation for the TETRA-URCA radio communication system has been granted by Commission Decision (16/797-DV03EN01) in accordance with Article 9(c) of the Interoperability Directive 2008/57/EC). Therefore, there is no need to ensure coexistence between GSM-R and FRMCS for the transmission of ETCS Data.
- Finland is in the process of renewing the current signalling systems which are becoming obsolete. This needs to be done in the upcoming years. The solution chosen is based on ETCS Level 2, digital interlockings, plus pre-FRMCS for the data transmission.
- TETRA system for voice and pre-FRMCS for data transmission will coexist in parallel for a period until the migration to new 5G based voice system is completed.
- Finland is in the process for tendering both the ETCS solution and the pre-FRMCS solution, for which they would like to have the Decision for the request for non-application and the draft technical rules submitted to EC and ERA assessed and validated.
- There will not be cross border traffic in the upcoming years (no foreign interoperable trains running in FI infrastructure, no FI trains going out of FI infrastructure to other EU networks) since there are different gauges and catenary systems used in Finland compared to the neighbouring countries.

1.2.3. The context related to current CCS TSI; FRMCS specifications; ETCS and FRMCS products

- Current CCS TSI (Regulation (EU) 2026/693) includes a version of FRMCS specifications that are not deemed valid for tendering process, as they are not yet complete.
- A complete set of FRMCS specifications that would allow tendering process is expected to be included in an amendment of CCS TSI by 2028 at the earliest.
- An ERA Technical Opinion and its addendum (ERA/OPI/2024-10) have been published in May 2025 with a draft version of the FRMCS specifications, version 2.1.0 that are to be used for testing and validation purposes.
- Current CCS TSI (Regulation (EU) 2026/693) includes specifications for ETCS subsystem and products compatible with FRMCS as a communication system. However, those products are not yet available in the market.
- FRMCS products/subsystems are not yet available in the market either.

1.3. Abbreviations

Abbreviation	Description
ATO	Automatic Train Operation
BL	Baseline
CCS	Control Command Signalling
CS	Circuit Switched communication mode
EC	European Commission
EDOR	ETCS Data Only Radio
ERA	European Union Agency for Railways
ETCS	European Train Control System
EU	European Union
FI	Finland
FRMCS	Future Radio Mobile Communication System
FSOMR	FRMCS System OM Remote reference point/interface
FFFIS	Form Fit Functional Interface Specification
GSM-R	Global Communication System for Railways
HW	hardware
IM	Infrastructure Manager
MCX	MCX Mission Critical Services
MNO	Mobile Network Operator
NTR	National Technical Rules
OB	On-Board
OBapp	On-Board Application reference point/interface
QoS	Quality of Service
RBC	Radio Block Centre
RMR	Radio Mobile Railways
RU	Railway Undertaking
PS	Packet Switched communication mode
SIM	Subscriber Identity Module
SV	System Version
SW	Software
TETRA	Terrestrial Trunked Radio
TRK	Trackside
TSapp	TSAPP Trackside Application reference point/interface

Abbreviation	Description
TSI	Technical Specifications for Interoperability

2. Legal Background

According to the provisions of Article 19(1)(e) 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 881/2004¹ (Agency Regulation), the European Commission has the possibility to request the opinion of the Agency regarding requests by Member States for non-application of TSIs, in accordance with Article 7 of Directive (EU) 2016/797.

The CCS TSI (Regulation (EU) 2026/693) is in force and applicable in Finland.

The European Commission has received the request for non-application of CCS TSI (DC2025-FI-22) from Finland, mainly related to the following points of CCS TSI (Regulation (EU) 2026/693) (as per documents [1] and ANNEX 2, document [8]):

- 2.2 Scope, point (3) Data radio communication
- 4.2.1 CCS reliability, availability and safety characteristics relevant to interoperability
- 4.4 Operating rules (
- 4.2.4 Mobile communication functions for railways RMR
 - o 4.2.4.1.1 GSM-R Basic communication function
 - o 4.2.4.3 Data communication applications for ETCS and ATO
- 4.2.5.1 RMR air gap interface
- 4.2.6.2 Interface between RMR Data Communication and ETCS/ATO – applications
- 4.2.7.3 RMR/trackside ETCS and RMR/trackside ATO
- 4.2.11 Electromagnetic Compatibility between Rolling Stock and Control-Command and Signalling
- 4.2.16 Construction of equipment used in CCS subsystems
- 4.2.17 ETCS and Radio System Compatibility
- 4.5 Maintenance rules
- 4.2.20.2 Responsibility of the applicant for subsystem verification
- 6.1.2 Principles for testing ETCS, ATO and RMR
- 6.3 Table 6.3 Conformity assessment requirements for a Trackside Subsystem, point 6b

In CCS TSI Regulation (EU) 2023/1695, Article 10 states:

“Future Railway Mobile Communication System

Where the Agency has issued an opinion with the draft release specifications relating to the Future Railway Mobile Communication System (FRMCS), manufacturers and early implementers shall use those specifications in their pilots and shall inform the Commission and the Agency about each pilot at its beginning and keep them informed of the subsequent progress of those pilots.”

The Agency issued an Opinion with the draft release specifications (first published in December 2024 and amendment published in May 2025): ERA/OPI/2024-10. This Opinion shall be used by early implementers as indicated in Article 10 of CCS TSI Regulation (EU) 2023/1695.

¹ OJ L 138, 26.5.2016, p. 1.

3. Reference Documents

1. Commission Implementing Regulation (EU) 2026/693 of 19 March 2026 amending Implementing Regulation (EU) 2023/1695 as regards new testing specifications, a set of reduced specifications and transitional measures.
2. Request for a technical opinion to the Commission pursuant to Article 19(1)(e) of the EU Agency for Railway regulation (EU) 2016/796 on the non-application request DC2025-FI-22, referenced (Ares(2025)1140058919/12/2025))
3. Request for non-application of TSI, Ares (2025)4084798-21/05/2025, Accompanying letter, Form B and Annexes 1-4 and 9.
4. Addendum to the Request for non-application of TSI (DC2025-FI22); ARES(2025)9260852 - 16/09/2025, annexes 4, 5, 6, 7 and 8.
5. Notified Draft Technical Rules, pre-FRMCS OB (RDD: 65310); Rules for Pre-FRMCS radio system On-board.
6. Notified Draft Technical Rules (SRD: FI-FI-2684-1-D); Rules concerning Pre-FRMCS trackside equipment.
7. Response to request for further information 29/10/2025 (ARES (2025)926085297);
8. Response to request for further information 31/03/2026- Ares(2026)3406243;

Note 1: ERA has based its assessment in the English translation of those documents. Those were not official translations.

Note 2: The complete set of documents used in the assessment has been included in ANNEX 2.

4. Analysis

4.1. TECHNICAL DETAILS OF THE PROPOSED SOLUTION

4.1.1. Scope and timeline of the pre-FRMCS solution

- 4.1.1.1. *The solution proposed is to equip the Finnish rail network and existing rolling stock with a data radio solution that utilizes 5G public radio networks, named as pre-FRMCS, to be used for ETCS data communication:*
- 4.1.1.2. *The deployment of pre-FRMCS is planned to be implemented on the EKA section of the track by Q2/2027 to allow operation in ETCS.*
- 4.1.1.3. *In a second phase (2028-2040), the plan is to equip the entire FI rail network with ETCS L2 SV 2.2 and this pre FRMCS solution. It is not clear by which date it would be possible to use FRMCS (compliant to TSI) in their projects, therefore, the understanding is that until 2040, a pre-FRMCS based solution will be installed together with ETCS BL4 SV 2.2.*
- 4.1.1.4. *There is currently no ETCS equipment on the market that implements BL4 SV 3.0 (for OB) nor BL4 SV 2.3 (for TRK) (compatible with FRMCS). The solution proposes the use of BL4 SV 2.2 instead.*
- 4.1.1.5. *According to Finland's proposal, the pre-FRMCS solution could be upgraded to FRMCS between 2040 and 2050, depending on the operational needs and the availability of products. Finland will examine the techno-economic feasibility of the pre-FRMCS – FRMCS upgrade. Clarification: 3 years after the availability of the FRMCS specifications, subject to a study, the trackside could be upgraded to operate both with pre-FRMCS and FRMCS, to be able to accept trains compliant to the CCS TSI. It is not clear by which date they may upgrade the fleet already fitted with pre-FRMCS, nor when there will be trains with FRMCS (TSI compliant) solutions, therefore we understand that at least until 2040, there will be no plan to upgrade the trackside to a TSI compliant-FRMCS based solution.*
- 4.1.1.6. *The introduction of the pre-FRMCS system applies to existing rolling stock (locomotives and multiple unit trains) actually running on the Finnish 1524 mm rail gauge network and to rolling stock to be procured before FRMCS becomes available.*
- 4.1.1.7. *It is highly unlikely that there is cross border traffic which would need interoperable rolling stock and an FRMCS compliant radio network. According to Finland's ERTMS strategy the border crossing station will be equipped with ETCS by 2037, but cross border traffic would need to wait for interoperable track gauge and catenary system to be available.*

4.1.2. Remarks on the proposed pre-FRMCS solution

- Proposed solution for radio system On-Board to use pre-FRMCS for ETCS data communication:

- 4.1.2.1. *The solution proposed for On-Board is not compatible with GSM-R*
 - 4.1.2.2. *The solution proposed for On-Board is aligned with the expected FRMCS requirements with respects to the radio frequencies used, the use of 5G for the transport layer and the implementation of multipath.*
 - 4.1.2.3. *The solution proposed for On-Board is not compatible with FRMCS, as described in the draft specifications included in the ERA Opinion ERA/OPI/2024-10:*
 - a. *OB_{app} interface is not implemented.*
 - b. *MCX client is not implemented.*
 - c. *Other important features needed for interoperability are not implemented: FSOMR, identifiers, addressing schemes, etc.*
 - 4.1.2.4. *This leads to the following situation: Trains equipped with this pre-FRMCS solution cannot run in CCS TSI compliant tracks (current or future). They can only run in pre-FRMCS tracks.*
 - 4.1.2.5. *The interface pre-FRMCS On-Board - ETCS On-board is compatible with ETCS OB BL4 SV2.2 (although not enough details on the interface are provided, only a declaration from FI).*
 - 4.1.2.6. *The pre-FRMCS On-Board shall install 3 radio modules, each of them with a SIM card belonging to each of the MNOs that will provide 5G coverage in the Finnish network. This is an additional requirement compared to the draft FRMCS specifications, where only 2 radio modules are mandated.*
- Proposed solution for radio system Trackside to use pre-FRMCS for ETCS data communication:

- 4.1.2.7. *The solution proposed for Trackside is not compatible with GSM-R.*
- 4.1.2.8. *The solution proposed for Trackside is aligned with the expected FRMCS requirements with respects to the use of 5G for the transport layer and the implementation of multipath.*
- 4.1.2.9. *The solution proposed for Trackside is not compatible with FRMCS, as described in the draft specifications included in the ERA Opinion ERA/OPI/2024-10:*
- a. TS_{opp} interface is not implemented.*
 - b. MCX client is not implemented.*
 - c. Trackside Gateway is not implemented.*
 - d. MCX server is not implemented.*
 - e. Requirements for the Transport Network are not included (neither in the description of the solution nor in the draft NTRs)*
 - f. other features needed for interoperability as identifiers, addressing schemes, etc. are not implemented.*
- 4.1.2.10. *This leads to the following: CCS TSI compliant trains (current or future) cannot run on this trackside. Only trains equipped with pre-FRMCS can run on this trackside.*
- 4.1.2.11. *The 5G network is used as a Service by the Finnish IM: it relies on MNOs to provide this service. The frequencies used by the MNOs are compatible with those stated in the current versions of FRMCS specifications (mandatory support for FRMCS On-Boards). Multipath is also mandatory for FRMCS On-boards. Under these circumstances, future CCS TSI compatible trains can use them. However, it will still be needed to ensure adequate roaming agreements, appropriate coverage and QoS policies for both pre-FRMCS trains and FRMCS trains. There are no indications given about the provision of SIM cards for foreign trains.*
- 4.1.2.12. *The interface pre-FRMCS Trackside- ETCS Trackside is compatible with ETCS TRK BL4 SV2.2 (although not enough details on the interface are provided, only a declaration from FI).*

- Proposed solution for ETCS to use pre-FRMCS for its data communication:

4.1.2.13. *Both ETCS Trackside and ETCS On-Board BL4 SV2.2 subsystems will be able to communicate via pre-FRMCS solution without any modification in the Euroradio Layer. That is possible because the modifications/adaptations needed will be only done in the pre-FRMCS solution, beyond what is specified in the FFFIS for Euroradio, with an adaptation of the AT commands used for GSM-R. For the ETCS application, it will be as if it would be operating in GSM-R PS mode².*

4.1.2.14. *Taking this into account, a non-application request does not seem to be needed for the ETCS part.*

Disclaimer: ERA has not received sufficient details on the ETCS solution, just some indications about the compatibility between pre-FRMCS solution and ETCS solutions (information received only in the clarification request from ERA).

4.1.3. *Conclusion on the proposed pre-FRMCS solution*

4.1.3.1. *The pre-FRMCS solution is not CCS TSI compliant. It neither implements GSM-R nor all the elements expected to be part of the FRMCS communications, as per the draft specifications included in the ERA Opinion ERA/OPI/2024-10.*

4.1.3.2. *Nevertheless, the pre-FRMCS solution is presented by FI as being upgradeable later to an FRMCS compliant solution.*

4.2. **COMPATIBILITY OF THE PROPOSED SOLUTION WITH CCS TSI COMPLIANT SYSTEMS**

4.2.1. *Upgrade paths of the proposed pre-FRMCS solution to an FRMCS compliant solution*

- Upgrade of the solution for radio system On-Board from pre-FRMCS to FRMCS for ETCS data communication:

² The pre-FRMCS On-Board System connects to the ETCS On-Board using the existing interface to the EDOR. The ETCS application handles the pre-FRMCS On-Board System as if it was an EDOR, therefore, the fact that the transmission network used is not GSM-R is transparent to the ETCS application. The pre-FRMCS data transmission relies on packet switching, hence, the ETCS application (coordinating function) shall choose the GSM-R PS mode as transmission mode.

- 4.2.1.1. *Upgrade needed for the pre-FRMCS On-Board equipment:*
- a. *Implementation of OB_{app} interface (possible HW and SW upgrade)*
 - b. *Installation of MCX-client for loose application data communications. (SW upgrade)*
 - c. *Support for frequency bands N100 and N101 may be needed, if the existing modems would be replaced with other ones in case trains need to run in TSI compliant tracks. (HW upgrade)*
 - d. *upgrade of ETCS On-Board to ETCS BL4 sv3.0 (HW and SW upgrade)*
 - e. *Implementation of FSOMR, identifiers, addressing schemes (SW and configuration)*
 - f. *alignment of cybersecurity requirements.*
- 4.2.1.2. *The trains fitted with the pre-FRMCS solution will not need to be upgraded if they do not need to run in lines outside Finland: the proposed evolution of the trackside continues to support the pre-FRMCS existing trains.*
- 4.2.1.3. *Only new Finnish trains and non-Finnish trains would need to be equipped with an FRMCS compliant solution.*
- Upgrade of the solution for radio system Trackside from pre-FRMCS to FRMCS for ETCS data communication:

- 4.2.1.4. *Upgrade needed for the pre-FRMCS Trackside equipment:*
- a. *Implementation of TS_{app} interface (SW upgrade and possible HW)*
 - b. *Installation of MCX-client for loose application data communications. (SW upgrade)*
 - c. *Deployment of MCX Server (HW and SW upgrade)*
 - d. *Installation of Trackside Gateway (HW and SW upgrade)*
 - e. *Appropriate roaming agreements should be put in place to ensure that coverage and QoS are adequate and sufficient both for Pre-FRMCS and FRMCS trains.*
 - f. *upgrade of ETCS Trackside to ETCS BL4 SV2.3 (SW upgrade and possible HW)*
 - g. *implementation of routing, identifiers, addressing schemes (SW and configuration)*
 - h. *alignment of cybersecurity requirements.*
- 4.2.1.5. *According to the FRMCS draft specifications in ERA Opinion ERA/OPI/2024-10, the use of RMR frequencies at trackside is not mandatory as the On-Board support of MNOs frequencies and multipath is a Mandatory requirement. If FRMCS final specifications were changed, this would need to be reevaluated.*
- 4.2.1.6. *Although the FRMCS On-Boards will support MNO frequencies and multipath, the use of more than 2 Radio Modules is not mandated, therefore it will be needed to ensure availability of the radio access through appropriate roaming agreements for all trains in the future, making sure that the needed QoS and performances can be achieved for the trains.*
- 4.2.1.7. *The upgrade of the Trackside solution to make it compatible with FRMCS (CCS TSI compliant) is a decision to be taken in the future, pending some studies to be carried out in Finland.*
- 4.2.1.8. *The upgrade will be required only to ensure technical compatibility with CCS TSI compliant trains (either new Finnish fleet, equipped with TSI compliant On-Boards or non-Finnish trains entering the Finnish railway network).*

4.2.2. Cybersecurity provisions

- 4.2.2.1. *The benefits for cybersecurity when using MCX are missing.*
- 4.2.2.2. *The 5G cybersecurity related requirements are not explicitly mentioned (unknown).*
- 4.2.2.3. *There are missing requirements out of those already included in FRMCS draft specifications (related to authentication, cryptography and subscription).*
- 4.2.2.4. *Given the differences with the expected technical solution in CCS TSI, there is a potential incompatibility detected: trains compatible with the CCS TSI will not be able to initiate the communication as required unless the Finnish solution is aligned with the CCS TSI requirements*
- 4.2.2.5. *There are additional requirements from NSA FI, mainly on SW integrity check and log collection. These are not explicitly included in the file submitted by Finland, but they are not covered in CCS TSI. These additional requirements should be included in the NTRs when needed for the operation in Finland.*
- 4.2.2.6. *For all the above, there is a risk that some of the requirements not specified in detail impose changes to the vehicles, depending on the final specifications.*

4.2.3. Compatibility of pre-FRMCS with ETCS

- Short term proposed solution:

4.2.3.1. *Trackside: pre-FRMCS Radio and RBC BL4 SV 2.2*

Compatible only with pre-FRMCS trains.

4.2.3.2. *On-board: pre-FRMCS Radio and ETCS OB BL4 SV2.2*

Compatible only with pre-FRMCS trackside.

- Upcoming phases

4.2.3.3. *It is expected that RBC BL4 SV2.3 will be able to handle at the same time pre-FRMCS/ETCS BL4 SV2.2 and FRMCS/ETCS BL4 SV3.0 trains.*

4.2.3.4. *Trackside: FRMCS & pre-FRMCS Radio and RBC BL4 SV2.3*

Compatible with pre-FRMCS equipped trains and FRMCS (TSI compliant) equipped trains.

4.2.3.5. *On-board: existing fleet with pre FRMCS Radio and ETCS OB BL4 SV2.2/ new fleet with FRMCS radio and ETCS OB BL4 SV3.0. Existing fleet compatible with pre-FRMCS tracks; new fleet compatible with FRMCS (TSI compliant) tracks.*

4.3. CONSIDERATIONS RELATED TO THE QUESTIONS RAISED BY THE EUROPEAN COMMISSION

4.3.1. Question 1

What is the risk to interoperability given the safeguards that Finland proposes (providing pre-FRMCS onboard equipment by the infrastructure manager, working to ensure three years after FRMCS product availability full compliance of trackside with FRMCS specifications, etc.)?

4.3.1.1. ERA answer

In the Agency's opinion, regarding the current CCS TSI in force, the proposed pre-FRMCS solution is not interoperable with GSM-R. CCS TSI compliant trains cannot run in FI infrastructure equipped with pre-FRMCS. In the same way, FI trains equipped with pre-FRMCS solution cannot run in a CCS TSI compliant line. If a CCS TSI compliant train (ETCS BL4 v2.2) may wish to run in the FI network, and the EDOR would be changed to pre-FRMCS by the IM, it would be able to run in the FI infrastructure but would lose the compliancy to the CCS TSI in force.

In future, when FRMCS specifications will be included in the CCS TSI, the situation will be the same. CCS TSI compliant trains will not be able to run in pre-FRMCS tracks, until there is an upgrade of the trackside to make it interoperable and compliant to CCS TSI. In the same way, pre-FRMCS trains, if not upgraded to full FRMCS, will not be able to run in CCS TSI compliant lines.

Therefore, there is a potential interoperability risk. However, FI indicates that border crossing traffic is not expected in the upcoming years (there are other technical constraints due to the gauge and the catenary system). Therefore, the risk is minimised, and it is only a theoretical one.

In the future, if border crossing would be possible or if FRMCS CCS TSI compliant equipment will be fitted in the FI trains, the pre-FRMCS trackside will also need to be upgraded to full FRMCS solution, CCS TSI compliant.

It is indicated that a future upgraded FRMCS trackside will be able to handle pre-FRMCS and full FRMCS OB. If not, pre-FRMCS trains will need to be upgraded when the trackside may evolve.

Regarding the safeguards proposed by Finland:

- a) Providing pre-FRMCS onboard equipment by the infrastructure manager: this reduces the impact (technical and economical) for the RU and ensures that the onboards are compatible with the pre-FRMCS infrastructure. However, this does not have an impact on the interoperability of the solution.
- b) Working to ensure three years after FRMCS product availability full compliance of trackside with FRMCS specifications: although an early migration to a full compliant FRMCS solution would be desirable, there are no clear indications of when this would be needed for the operation nor actually deployed.

4.3.2. Question 2a

Are the declarations from the request for non-application reflected in the draft national rules submitted to the Commission and the Agency? List of relevant declarations:

“Existing studies and analysis on the technical, economical and geographical impacts of the pre-FRMCS solution to the Finnish railway system (...) show that pre-FRMCS does not create barriers for market entry on the Finnish rail network”

4.3.2.1. ERA answer

Draft national technical rules (NTRs) submitted show that there is a barrier for market entry in FI for interoperable trains.

Studies and analysis on the technical, economical and geographical impacts of the pre-FRMCS solution are not reflected in the draft NTRs because they are technical documents. From a technical standpoint, pre-FRMCS solution poses interoperability problems because it is not compatible with the CCS TSI.

4.3.3. Question 2b

Are the declarations from the request for non-application reflected in the draft national rules submitted to the Commission and the Agency? List of relevant declarations:

“Any On-Board FRMCS router will be able to do roaming with Finnish MNO providers” and in phases 1 and 2
 “The rolling stock will be equipped in accordance with the national rules of the pre-FRMCS”

4.3.3.1. ERA answer

For the first point of the question ("any On-Board FRMCS router will be able to do roaming with Finnish MNO providers"), the draft NTRs do not address it. There are no provisions for roaming for On-Board FRMCS equipped trains. The pre-FRMCS solution described in the draft NTRs considers that all vehicles will be fitted with 3 radio modules and will have 3 SIM cards (one from each of the MNOs providing the service).

On-board FRMCS equipped trains could be able to do roaming with Finnish MNO providers under the following circumstances:

1. The frequencies supported by the OB FRMCS Radio Modules are the ones operated by the FI MNOs. This seems to be the case, as in the current version of the FRMCS Specifications, support of those MNO frequencies by On-board FRMCS is mandatory.
2. There is a roaming agreement with the SIM providers of the On-board FRMCS or there is a subscription to the FI MNOs and the corresponding SIM cards are provided.

However, even if those circumstances are fulfilled, a vehicle equipped with CCS TSI compliant On-board ETCS and On-board FRMCS only will not be able to communicate with pre-FRMCS+ETCS trackside, as, MCX services, and other interoperability features, as identifiers and profiles are not implemented in FI network.

For the second point ("the rolling stock will be equipped in accordance with the NTRs of the pre-FRMCS"), the draft NTR does state this obligation.

4.3.4. Question 3

How do you assess the feasibility to ensure trackside FRMCS compatibility of the pre-FRMCS solution (initial analysis potentially complemented once FRMCS V3 specifications are available)?

4.3.4.1. ERA answer

Indeed, as explained in sections 4.1.2, 4.1.3 and 4.2.1.4, trackside pre-FRMCS solution is not compatible with FRMCS as such. Trackside would need to be upgraded to FRMCS in the way described in Question 4 [4.3.5].

4.3.5. Question 4

How do you assess the feasibility of an upgrade of the trackside radio within three years of FRMCS product availability to become FRMCS compatible, as stated in Annex 9 of Finnish application (initial analysis potentially complemented once FRMCS V3 specifications are available)?

4.3.5.1. ERA answer

- a) Upgrade of $T_{s_{app}}$ /MCX/trackside gateway deemed feasible in 3 years. It is about trackside servers, parametrization, profiles, identifiers, etc. to be configured.
- b) Upgrade to support RMR frequencies not needed if the solution currently described in draft FRMCS specifications is maintained in the final FRMCS V3 specifications to be published in CCS TSI. In case

an FRMCS based only on MNO is not maintained in the final specifications, the deployment of a proprietary Radio Network would be mandated. This deployment seems to be far more difficult in three years because it implies deploying sites on track, network installation, optimisation, coexistence with other frequencies, etc.

- c) Even if the use of RMR frequencies at trackside is not mandatory, appropriate roaming agreements should be put in place to ensure that coverage and QoS are adequate and enough both for pre-FRMCS and FRMCS equipped trains. This is deemed feasible in 3 years.

On-board FRMCS will support MNO frequencies and multipath, but the use of more than 2 Radio Modules is not mandated, therefore Finland will need to analyse how to ensure that the required QoS and performances can be achieved for all the trains, for instance by appropriate radio access through roaming agreements.

- d) ETCS TRK BL4 SV2.3 to be installed. Upgrade deemed feasible in 3 years once products are commercially available.
- e) FRMCS identifiers, addressing schemes to be configured. Upgrade deemed feasible in 3 years, new engineering could be studied prior to the upgrade.
- f) Routing engineering to access all the nodes required for ETCS service to be configured. Upgrade deemed feasible in 3 years, new engineering could be studied prior to the upgrade.
- g) Alignment of cybersecurity requirements. Upgrade deemed feasible in 3 years.

The feasibility of upgrade is strongly related to the ETCS products' availability also.

4.3.6. Question 5

How do you assess the need to keep the pre-FRMCS solution until 2040-2050 in the context of the declaration that Finland plans to ensure FRMCS compatibility three years after FRMCS product availability?

4.3.6.1. ERA answer

Once the FI trains are equipped and running with pre-FRMCS for ETCS, they may continue to run with this solution for many years, given that, even when upgrading the trackside to BL4 SV2.3, pre-FRMCS compatibility will be maintained.

Note that the radio access for pre-FRMCS and for the envisaged FRMCS solution in FI is the same: provided by MNOs. There is no modification expected with regards to the radio network for the FRMCS (TSI compliant) solution.

For the vehicles that may install a full FRMCS solution for ETCS, the trackside will have to be upgraded but it will keep the compatibility with pre-FRMCS. For FRMCS trackside, the installation of MCX and the trackside gateway will be performed

When the trains using pre-FRMCS for ETCS may need to change the voice radio equipment (currently using TETRA system, but with an evolution path towards 5G MNO with MCX), it will be possible to continue to use the pre-FRMCS system for ETCS. This evolution of the voice radio system in FI is expected before 2040.

Although FI may decide to perform the upgrade for the voice system and for the ETCS (radio and application) at different moments, , without an impact on the service itself, this will imply operating and maintaining two different systems at the same time which imply extra costs, therefore there would be benefits for carrying out the upgrade at the same time for voice and data.

Therefore, the need to keep the compatibility with pre-FRMCS is related to the existence of vehicles using the pre-FRMCS solution for ETCS that may not be upgraded to FRMCS in the timeframe 2040 - 2050. However, it would be advisable to migrate them at the same time as the migration of voice application.

4.3.7. Question 6

What are the risks for the existing onboard equipment after the upgrade from pre-FRMCS solution to equipment fully FRMCS compliant?

4.3.7.1. ERA answer

1. Risks for pre-FRMCS trains in FI: No risk if they are not upgraded, as they are expected to be compatible with the trackside (ETCS BL4 SV 2.3+pre-FRMCS solution in place)
2. Risks for pre-FRMCS trains in case they need to run in a CCS TSI compliant track: ETCS OB needs to be changed and pre-FRMCS needs to be upgraded in the following way:
 - a) Use of OB_{app} (possible HW and SW upgrade)
 - b) Use of MCX-client for loose application data communications. (SW upgrade)
 - c) Support for frequency bands N100 and N101 could be possible, if existing modems would be replaced with another in case trains need to run in other TSI compliant tracks using RMR. (HW and SW upgrade)
 - d) ETCS OB BL4 SV3.0 (HW and SW upgrade)
 - e) FSOMR, identifiers, addressing schemes to be implemented (SW and configuration)
 - f) Alignment of cybersecurity requirements (SW and configuration)

4.3.8. Question 7

Is the proposed ETCS to pre-FRMCS interface solution compliant with CCS TSI and if not, to what extent non-compliant? Note: this question was meant for a second phase of the Opinion, but ERA deems feasible to already answer it.

4.3.8.1. ERA answer

Note: This information is provided by FI in the additional questions submitted by ERA and EC. ERA has not received any evidence that allows to assess this interface in detail.

According to the information provided by FI, there is no modification needed of the interface between the ETCS OB and ETCS TRK and the pre-FRMCS radio system compared to the interfaces described in current CCS TSI: ETCS onboard SV2.2-EDOR and ETCS trackside SV2.2 -GSM-R trackside interfaces. This means that the ETCS SV2.2 interface to pre-FRMCS is fully compliant with the CCS TSI in force (Regulation (EU) 2026/693).

The adaptation is performed in the pre-FRMCS system.

The interface from ETCS to pre-FRMCS is used in the place of the interface from ETCS to GSM-R: ETCS uses PS connection and the pre-FRMCS system interprets the GSM-R PS commands as commands for the MNO modem.

When upgrading the trackside to ETCS (RBC) BL4 SV 2.3, FI will keep the pre-FRMCS system in the trackside; they will include the connection to the FRMCS trackside system (for which, TS_{app} and MCX will be needed).

The interface to pre-FRMCS will continue to be used in the place of the interface to GSM-R and the FRMCS interface is expected to follow the CCS TSI specifications. In that respect, the ETCS interfaces are expected to be fully compliant with the CCS TSI that will include FRMCS.

5. The opinion

ERA has not assessed the fitness of the pre-FRMCS solution to carry ETCS Data with the required quality of service and KPIs. ERA analysis is limited to the study of interoperability and upgradeability aspects of the solution as per the questions asked by the EC. No safety aspects have been assessed in this opinion.

After the analysis of the FI Request for non-application and the answers provided to EC to its request for a Technical Opinion to ERA, the Agency's opinion is the following:

1. **The proposed pre-FRMCS (both On-board and trackside) solution is not compliant with CCS TSI**, neither to the current CCS TSI in force (Commission Implementing Regulation (EU) 2026/693) nor will it be compliant to the future one expected to include the FRMCS specifications (FRMCS first edition). It is also not compliant to the draft FRMCS specifications included in ERA/OPI/2024-10.
2. The pre-FRMCS solution could be considered only by European Commission as an acceptable temporary solution for FI due to the following reasons:
 - FI has already a non-application of CCS TSI granted for the use of an alternative radio system for voice communication, that will be replaced by a 5G Mission Critical system in the coming years.
 - GSM-R is not in use anymore in FI infrastructure: installing GSM-R at this point in support of data transmission for ETCS is not advisable due to the obsolescence of the system.
 - There are currently no FRMCS products in the market.
 - There are currently no Trackside ETCS BL4 SV2.3 and On-Board ETCS BL4 SV3.0 products in the market (compatible with FRMCS).
 - FI is going to start the deployment of ETCS L2 as their signalling system is becoming obsolete and they need to replace the interlockings in a short time frame.
 - There will be no cross-border traffic between Member States in the upcoming years (no foreign interoperable trains running in FI infrastructure, no FI trains going out of FI infrastructure to other EU networks) since there are different gauges and catenary systems used in Finland.
 - Convergence of the proposed solution to FRMCS is feasible in the medium-long term.
3. The Agency's consideration of the interoperability risks can be found in 4.3.1.1.
4. The Agency's view on the feasibility to upgrade the pre-FRMCS solution to full FRMCS, the risks and other implications after the upgrade, is given in 4.3.4.1, 4.3.5.1, 4.3.6.1 and 4.3.7.1.
5. The Agency's consideration of the compliancy to CCS TSI of the interface between pre-FRMCS and ETCS can be found in 4.3.8.1.
6. The Agency's remarks on the draft NTRs presented together with the non-application request can be found in 4.1.2 and 4.2.3.
7. The Agency recommends the European Commission to agree with FI on an upgrade of its trackside infrastructure to full FRMCS system once the products are available on the market, to comply with CCS TSI and to allow for interoperable trains to run in their infrastructure. The upgrade path is deemed feasible by ERA from technical, economical and time standpoint. Besides, it would be advisable to synchronise this upgrade with the migration of the Voice system.
8. The Agency recommends the European Commission to agree with FI to equip in the future new fleets with full CCS TSI compatible subsystems, once products are available and once the FI trackside is upgraded.
9. The Agency's opinion is that the Finnish case is not applicable to other EU Member States and would strongly recommend implementing full FRMCS compatible solutions from the beginning. For early implementers that cannot wait to FRMCS specifications to be officially published in CCS TSI, the specifications published in the TO ERA/OPI/2024-10 and its addendum or in any other later version, should be the basis for the tendering process.

Valenciennes, X May 2026

Oana GHERGHINESCU
Executive Director

ANNEX 1

Ref. Ares(2025)11400589 - 19/12/2025



EUROPEAN COMMISSION
DIRECTORATE-GENERAL FOR MOBILITY AND TRANSPORT
Directorate C – Land
The Director

Brussels
MOVE.DDG2.C/KS

**NOTE FOR THE ATTENTION OF Ms O. GHERGHINESCU EXECUTIVE DIRECTOR –
EUROPEAN UNION AGENCY FOR RAILWAY**

Subject: Request for technical opinion to the Commission pursuant to Article 19(1)(e) of the EU Agency for Railway regulation (EU) 2016/796 on the non-application request DC2025-FI-22

Article 19 (1) (e) of the ERA regulation (EU) 2016/796 sets out that the Commission may request an opinion from the Agency on a non-application request in relation to TSIs. Finland has requested a non-application of CCS TSI (regulation (EU) 2023/1695 and regulation (EU) 2016/919). Finland wished to install ETCS Baseline 4 SV 2.2 in conjunction with a pre-FRMCS radio version.

Both the radio itself and the ETCS System Version are not CCS TSI compliant. It is to be noted that Finland attempts to make the pre-FRMCS radio version as compliant with the upcoming FRMCS specifications as possible.

The Commission wish to verify with the Agency and obtain an opinion on:

Questions for the 1st phase opinion:

- What is the risk to interoperability given the safeguards that Finland proposes (providing pre-FRMCS onboard equipment by the infrastructure manager, working to ensure three years after FRMCS product availability full compliance of trackside with FRMCS specifications, etc.)?
- Are the declarations from the request for non-application reflected in the draft national rules submitted to the Commission and the Agency? List of relevant declarations:
 - “Existing studies and analysis on the technical, economical and geographical impacts of the pre-FRMCS solution to the Finnish railway system (...) show that pre-FRMCS does not create barriers for market entry on the Finnish rail network”
 - “Any On-Board FRMCS router will be able to do roaming with Finnish MNO-providers” and in phases 1 and 2 “The rolling stock will be equipped in accordance with the national rules of the pre-FRMCS”

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- How do you assess the feasibility to ensure trackside FRMCS compatibility of the pre-FRMCS solution (initial analysis potentially complemented once FRMCS V3 specifications are available)?
- How do you assess the feasibility of an upgrade of the trackside radio within three years of FRMCS product availability to become FRMCS compatible, as stated in Annex 9 of Finnish application (initial analysis potentially complemented once FRMCS V3 specifications are available)?
- How do you assess the need to keep the pre-FRMCS solution until 2040-2050 in the context of the declaration that Finland plans to ensure FRMCS compatibility three years after FRMCS product availability?
- What are the risks for the existing onboard equipment after the upgrade from pre-FRMCS solution to equipment fully FRMCS compliant?

Question for the 2nd phase opinion:

- Is the proposed ETCS to pre-FRMCS interface solution compliant with CCS TSI and if not, to what extent non-compliant?

We would appreciate an opinion in two phases: the first one concerning the pre-FRMCS radio aspects and as a second phase an opinion ETCS – FRMCS interface. We would count on your opinion within two months for the first phase once all documents pertinent to pre-FRMCS radio are provided to EC and ERA by Finland and for the second phase within two months once all documents pertinent to the ETCS - pre-FRMCS interface are provided.

Electronically signed

Kristian SCHMIDT

c.c.: ERA Pio Guido, Jo De Bosschere, Thomas Chatelet, Begona Domingo,
Wouter Malfait
DG MOVE Matthias Ruete, Christof Schoser

ANNEX 2

Number	Name of the document	Date	Description
1.	Request to ERA for TO on the non-application request DC2025-FI-22 (Ares(2025)1140058919/12/2025))	19/12/2025	Official letter for the request for the TO to ERA
2.	Request to ERA for TO on the non-application request DC2025-FI-22	06/03/2026	Official letter for the request for the TO to ERA, second version
3.	Request for non-application of TSI (Accompanying letter) (Ares (2025)4084798-21/05/2025)	21/05/2025	Official letter for the request
4.	Form B: Template to communicate a non-application request for projects under Article 7(1)(c) of Directive (EU) 2016/797,	21/05/2025	Main document explaining scope, technical details and reason for the derogation.
5.	Annex 1: Geographical scope and timing of the PRE-FRMCS project and ERTMS deployment	21/05/2025	Geographical scope and timing. Non-technical but need for project description and scope.
6.	Annex 2: Reference numbers of the vehicles and other information	21/05/2025	List of potential vehicles affected by the Pre-FRMCS installation. Non-technical but need for project description and scope and the impact.
7.	Annex 3: Economic analysis and evidence	21/05/2025	Economic justification for the derogation.
8.	Annex 4: The table listing the non-applicable sections of the CCS TSI and the corresponding provision of the national legal regulation	21/05/2025	Non-applicable sections in the TSI and the alternative national regulations. Section 3.1 of the derogation template. Needed the technical analysis. SUPERSEDED.
9.	Addendum to the Request for non-application of TSI (DC2025-FI22)(ARES(2025)9260852 -16/09/2025)	16/09/2025	Addendum with the missing information, namely, the technical annexes (4-8). Needed for technical analysis.
10.	Annex 4: The table listing the non-applicable sections of the CCS TSI and the corresponding provision of the national legal regulation	16/09/2025	Non-applicable sections in the TSI and the alternative national regulations. Section 3.1 of the derogation template. Needed the technical analysis.

11.	Annex 5: Pre-FRMCS Regulation-EN translation	16/09/2025	National regulation that substitutes TSI provision. Needed for the technical and non-technical analysis. Draft-NTRs. SUPERSEDED.
12.	Annex 5: Pre-FRMCS Regulation-Finish	16/09/2025	Same document as previous one in FI language. SUPERSEDED.
13.	Annex 5: Pre-FRMCS Regulation-EN translation #2	16/09/2025	Same document as previous one in another translation. SUPERSEDED.
14.	Annex 6: Pre-FRMCS Description and On-board Technical Requirements- EN	16/09/2025	Technical requirements for OnBoard. Needed for the technical analysis. Corresponding Annex 1 of Regulation. SUPERSEDED
15.	Annex 6: Pre-FRMCS Description and On-board Technical Requirements- FI	16/09/2025	Technical requirements for OnBoard. Needed for the technical analysis. Corresponding Annex 1 of Regulation. SUPERSEDED
16.	Annex 7: Pre-FRMCS Trackside Technical Requirements- EN	16/09/2025	Technical requirements for Trackside solution. Needed for the technical analysis. Corresponding Annex 2 of Regulation. SUPERSEDED
17.	Annex 7: Pre-FRMCS Trackside Technical Requirements- EN	16/09/2025	Technical requirements for Trackside solution. Needed for the technical analysis. Corresponding Annex 2 of Regulation. SUPERSEDED
18.	Annex 8: Checking and testing the radio solution for pre-FRMCS data radio- EN	16/09/2025	Test specification for Pre-FRMCS solution (Trackside and OB). Corresponding to Annex 3 of the Regulation. SUPERSEDED
19.	Annex 8: Checking and testing the radio solution for pre-FRMCS data radio-FI	16/09/2025	Test specification for Pre-FRMCS solution (Trackside and OB). Corresponding to Annex 3 of the Regulation. SUPERSEDED
20.	Annex 9: Upgradability of the trackside Pre-FRMCS radio solution for new rolling stock	21/05/2025	Upgradability conditions for trackside and on-board for the pre-FRMCS solution. Needed for the technical analysis. Sections 4.1. Technical justification, 2.2. Identification of the vehicles/list of subsystems affected.
21.	Public Mobile Radio Networks Suitability for ETCS Traffic; FTIA 25/2023	Apr-23	Pre- study about the public 4G/5G mobile network suitability of carrying ETCS traffic reliably. Needed for the technical analysis.

22.	Future renewal costs of interlocking systems	29/10/2025	Related to the response by FIN to question 3 on class B obsolescence.
23.	Request for further information – Finland’s request for non-application DC2025-FI-22 pursuant Article 7(1)(c) of Directive (EU) 2016/797 -EN (ARES (2025)8278636 DC2025-FI-22)	01/10/2025	Request for further information from EC with specific questions. Needed for technical and non-technical.
24.	Request for further information – Finland’s request for non-application DC2025-FI-22 pursuant Article 7(1)(c) of Directive (EU) 2016/797-FI	01/10/2025	Request for further information from EC with specific questions. Needed for technical and non-technical.
25.	Response to request for further information – Finland’s request for non-application DC2025-FI-22 pursuant Article 7(1)(c) of Directive (EU) 2016/797 (29/10/2025 (ARES (2025)9260852)	29/10/2025	Answer to specific questions made by the EC. Needed for the assessment, mainly for the technical part.
26.	Notified pre-NTR Trackside	12/02/2026	Notified NTR trackside Pre-FRMCS. To be assessed together with the reference scenario table.
27.	Notified pre-NTR On-board	18/02/2026	Notified NTR On-board Pre-FRMCS. To be assessed together with the reference scenario table.
28.	Request for further information – Finland’s request for non-application DC2025-FI-22	06/03/2026	Request for further information from ERA/EC with specific questions. Needed to answer technical and non-technical questions of the TO and also to assess NTRs.
29.	Draft reply to DC2025-FI-22 10.3.25	10/03/2026	Reply from Finland to Commission's Request for further information from 06/03/2026
30.	Draft Reply from FI to the ERA reference scenario	11/03/2026	Reply from Finland to the ERA reference scenario for comparison with FRMCS specifications. Excel file.
31.	Request for further information – Finland’s request for non-application DC2025-FI-22 (Ares (2026)28/10532)	16/03/2026	Request for clarifications from ERA/EC with specific questions. Needed to answer technical and non-technical questions of the TO and also to assess NTRs.
32.	Request for further information – Finland’s request for non-application DC2025-FI-22	16/03/2026	Translation of the above letter
33.	Request for clarifications sent by e-mail	16/03/2026	Request for further clarifications from the letter above. Sent by e-mail only.

34.	Reply from FI to the request for clarifications (31/03/2026-Ares(2026)3406243)	31/03/2026	Reply from FI to the request for clarifications above. Clarifications included in the same document as but officially submitted.
35.	Reply from FI to the ERA reference scenario	31/03/2026	Reply from Finland to the ERA reference scenario for comparison with FRMCS specifications. Pdf file.