



UNIFE Paper

Focus needed to achieve FRMCS 1st Edition for TSI 2027

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Introduction

The Future Railway Mobile Communication System (FRMCS) is a priority technology for the future railway system. The need for FRMCS implementation is not only driven by the impending obsolescence of the Global System for Mobile Communications – Railway (GSM-R) and its associated challenges from 2030 onwards, but also due to the significant opportunities FRMCS will provide to enable and support railways' digitalisation. FRMCS will support existing applications such as ETCS and voice, as well as enable new applications such as ATO GoA1/2/3/4, data/video services and more generally essential services requiring telecom quality, flexibility and capacity, which is a core element of future competitive sustainable transport.

The development and review process of the FRMCS specifications are currently in full flow. In 2023, Europe's Rail Joint Undertaking (EU-RAIL) released a report on the FRMCS V2 and V3 Scope and Planning towards a market-ready start for FRMCS implementation in Europe. This document set out a transparent and mutually agreed understanding on the timing and specification output up to the TSI revision in 2027. The expectation of the mature FRMCS V3 specifications and inclusion as the 'FRMCS 1st Edition' in the TSI 2027 has recently been reiterated in the new request from the European Commission (EC) to the European Union Agency for Railways (ERA) for the revision of the TSIs, with FRMCS 1st Edition's inclusion expected within the ERA recommendation deliverable by the end of 2026. To support this goal and timeline, in 2024 EU-RAIL issued a call for testing and validation of requirements as expressed in FRMCS V2 specifications based on pre-commercial products, providing inputs to the FRMCS V3/1st Edition specifications.

Status and current challenge

The draft of the FRMCS Specifications have been under the leadership of UIC and the UIC FRMCS Program. Since the beginning of the FRMCS project, European railway telecommunications supply industry, represented by the UNITEL Committee of UNIFE, have been in active cooperation with the UIC, ERA and other railway stakeholders across Europe in defining and specifying FRMCS as the successor of GSM-R. The common objective is to provide a technology solution which will gradually replace 2G based GSM-R, while minimising the economic pressure on railways stakeholders and eliminating the potential risks which this technology change can bring.

As planned, the draft FRMCS V2 specifications were delivered by UIC at the end of March 2024 and are currently being reviewed by the sector through the ERA EECT process. We note this was the first occasion that the industry had full visibility on the contents of the V2 specifications. Unfortunately, during the reviews the European rail supply industry has raised concerns on the overall completeness, anticipated content, and quality of the draft FRMCS V2 specifications presented in the ERA EECT. This has resulted in extensive comments being received by involved stakeholders and too many points remain open and subject to extensive discussion. The lack of industry (product/implementers) participation and expertise in the drafting has become evident in terms of a set of technical gaps and unresolved challenges, which leave the industry reviewers struggling to transform the draft specifications into tangible interoperable products providing the required system functionality. In addition, some content from the FRMCS V1 specifications, seen as somewhat of a placeholder referenced in the 2023 TSIs, still require consensual conclusion to be implemented. As such, the way of working must change if FRMCS is to succeed as expected by the market.

The following examples highlight the issues being seen in the ongoing ERA EECT meetings which need to be addressed in a more efficient manner:

- ▶ Features and functions which are essential for ensuring railway operations and which are supported with GSM-R today, are still not sufficiently specified to achieve interoperability/interworking and result in more effort to align implementations of different vendors:
 - ▶ Railway Emergency Communication (REC) and basic voice services, Border Crossing, FRMCS Profile(s), FRMCS handheld
- ▶ Features and functions which are related to other railway domains (e.g. rolling stock) developed in isolation elsewhere, yet impacting FRMCS and leading to non-alignment requiring further attention for FRMCS V2 and V3, or vice versa:
 - ▶ OB_{OM} and OM for on-board FRMCS, FS_{OMR} and RU/IM trackside management systems
- ▶ Features and functions which are supplementary, options, add-ons, non-essential for FRMCS V2 but have been extensively discussed and thereby lost focus and time:
 - ▶ OB_{RAD} and separation of radio module/radio function, Multi-Path, single UE for border crossing
- ▶ For the signalling suppliers, as manufacturers of the critical applications (i.e. ETCS or ATO) that will use FRMCS product, it is of paramount importance to ensure that FRMCS gateway interfaces like OBApp or TSApp are reliable and sufficiently tested and mature when the FRMCS V3/1st Edition specifications will be published. Errors on the FRMCS gateway interface specification may derive in unnecessary and costly software updates in the on-board products in service.

The current review of the FRMCS V2 specifications in the ERA EECT has reinforced the European railway supply industry's view to focus short-term on the GSM-R equivalency, in terms of functionalities, to guarantee the expected timelines for FRMCS V2 and V3 availability. The timely deployment of FRMCS is crucial and we should not jeopardise the foreseen timeline and availability within the TSI 2027 by aiming for all FRMCS functionalities from the start. The TSI 2027 and FRMCS 1st Edition will not only cover GSM-R equivalency and additional functions will be available, however, GSM-R equivalency must be the starting point and secured before selecting the further enhancements and low-hanging fruits.

Of course, the long-term objective will be clearly put on the development and implementation of further functionalities which clearly distinguishes FRMCS from GSM-R, adding significant benefits to the operations of the railways. However, this can only be achieved in a staged approach, allowing for successful introduction and migration from the legacy technology to meet the market requirements.

UNIFE's recommendation:

To guarantee the expected timelines are met and ensure a seamless introduction of a mature FRMCS 1st Edition in the TSI 2027:

- ▶ The work on FRMCS V2 and V3 specifications must first focus on functional equivalency to GSM-R, to ensure this is secured in the FRMCS 1st Edition for TSI 2027. Only then should the additional features be considered with a focus on real benefits coming with FRMCS and 5G achievable in the short time left. Full sector alignment is needed on the final scope of the FRMCS V2 specifications to be tested in the EU-RAIL project 'MORANE 2', V3 specifications as 'GSM-R +' for the FRMCS 1st Edition, and scope and roadmap for future releases.
- ▶ The time pressure for the rollout of FRMCS is becoming critical and investments into ETCS and ATO are already impacted due to the unavailability of FRMCS solutions. These serious challenges call for clear priorities and strict project management. As a consequence, the railway sector needs to focus on the stabilisation of those FRMCS requirements, which are relevant for ETCS, ATO and the essential voice functions. Once these requirements are stabilised and frozen, the railway sector can enter the implementation process and work in parallel on the specifications of the second priority features. Obviously, this demands the commitment of all stakeholders not to modify the priority one requirements in a way which endangers the compatibility with future specifications.
- ▶ UNIFE is repeating the call to enhance the cooperation between UNIFE, UIC and ERA and emphasises the need to ensure industry experts are involved and considered an equal partner in developing the FRMCS specifications (V2 and V3) development prior to the draft delivery to the ERA EECT process. Full visibility of the specifications is needed prior to EECT.
- ▶ There is an essential need to strengthen the cooperation with UIC and ERA in the FRMCS process. UNIFE recommends the ERA to be consulted periodically during the drafting process to provide 'quality gates' prior to officially receiving the drafts and EECT process launched.
- ▶ Careful review of categorisation of mandatory requirements and features must be done as there is a significant risk for elevated system costs without the operational need of some IMs and RUs.

Conclusions:

The European rail supply industry is committed to making FRMCS a success and ensuring the transitions to FRMCS is as smooth as possible. To achieve this objective and the timelines expected by the sector, we request enhanced cooperation between the industry, railways and EU institutions, and an urgent refocus on the scope and delivery of the FRMCS V2 and V3 specifications.

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