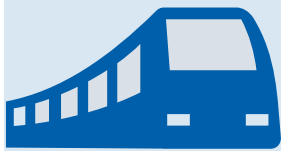


Rail needs its own spectrum to safely transport passengers and goods across Europe

Trains communicate via mobile radio systems using dedicated spectrum

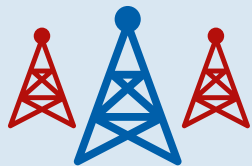
Dedicated railway communications networks are used throughout Europe contributing to the transportation, security and safety of about 9 billion passengers in Europe every year.



Application

Needs for dedicated network and spectrum:

- **Operation** (traffic management, ATO, shunting, crew communication, etc.)
- **Safety** (ERTMS, emergency calls)



Network

Networks supporting railway safety and operations must function within rail's coverage and performance constraints



Spectrum

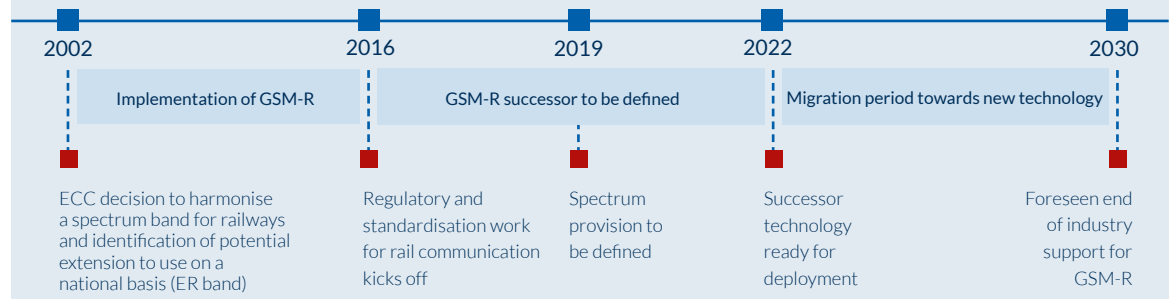
Networks' efficiency and thus safety depend on the conditions for using spectrum

A harmonised European approach to setting spectrum access conditions delivers societal benefits

- Removing technical barriers to international rail journeys for passenger travel and freight
- Improving safety of transport
- Promoting the competitiveness of the European railway sector, supporting an open supply market and reducing the overall cost of a train journey

Today's communication system is becoming obsolete and needs replacement

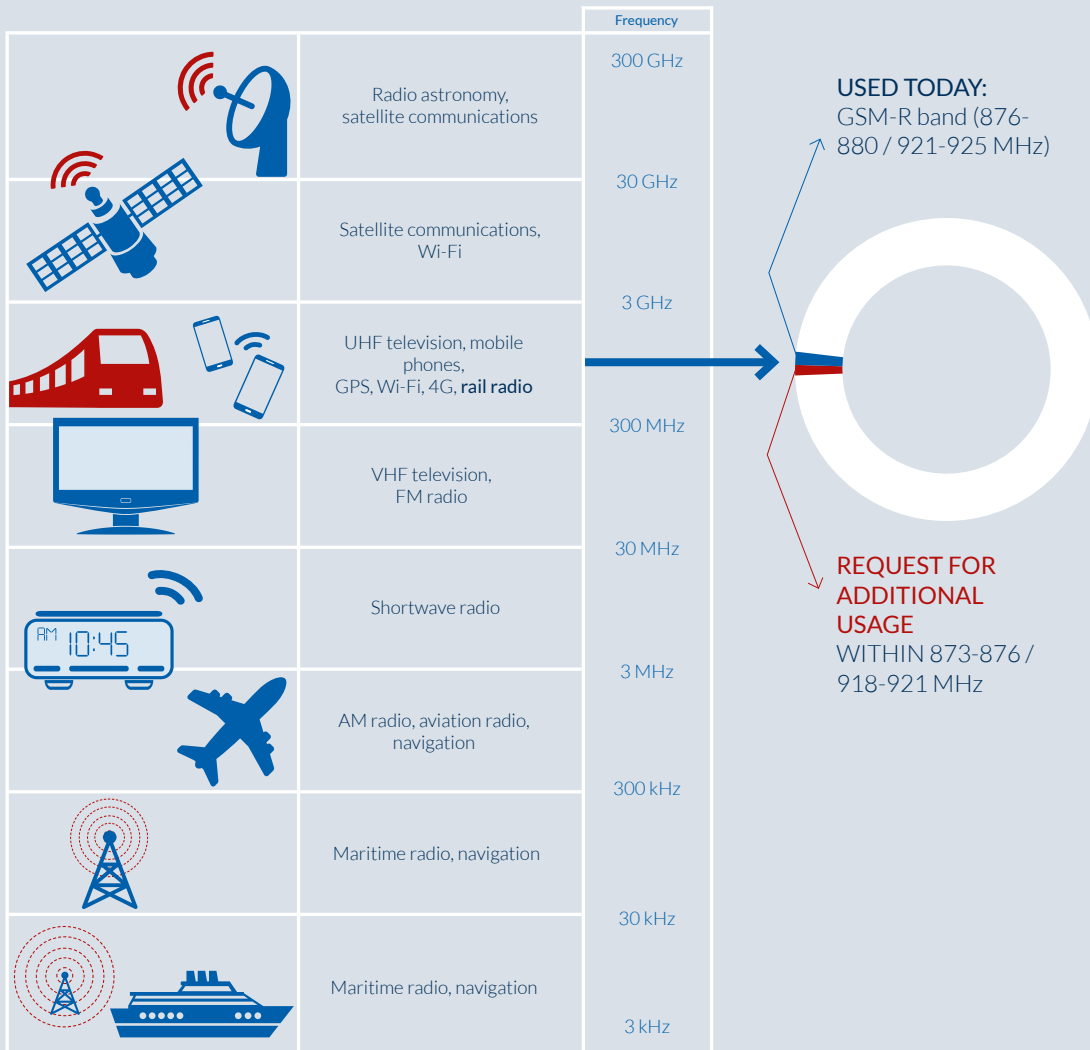
The current communication system (GSM-R) needs to be replaced as the underlying technology (GSM 2G) is being phased out by suppliers. The migration of the technical system must be organised on the basis of relevant spectrum access conditions.



Rail challenges	Technical impact
Support highly available, reliable and relevant radio coverage on about 114 000 km of railway tracks.	Need for spectrum for at least mission critical application - Several networks and spectrum solutions are being used today and will be required in the future to cover railways' needs (main tracks, including high-speed lines, tunnels, depot and shunting areas, as well as urban and rural lines).
Ensure continuous operation during the migration from the current communication system to another.	Need for additional spectrum - The full migration on a European scale will take many years. During the migration phase, both GSM-R and the future communication system will need to co-exist, thus temporarily increasing spectrum needs.
Preserve interoperability during and after the migration.	Need for a harmonised approach - Today, spectrum allocation is a national competence. A harmonised approach across borders will support cost-effective interoperability of the rail system.

Rail needs its own spectrum to safely transport passengers and goods across Europe

Additional harmonised spectrum for rail is essential to boost a digital single European railway area



Key messages



- **Current harmonised spectrum is an essential asset for railways** today and harmonised spectrum will also be needed tomorrow **to ensure safe and uninterrupted train operations.**
- As GSM-R is being phased out and the **European railway area needs a new mobile communication system**, it is now essential to define an **acceptable migration path** preserving investment made in GSM-R infrastructure and on-board equipment.
- **Additional spectrum is required** to provide enough capabilities in terms of enhanced services and applications **to manage the future of railway operations.**
- **Extending and harmonising** railway's use of spectrum in the **873-876 MHz / 918-921 MHz band**, in addition to the current GSM-R band, is the **most efficient option to promote interoperability** and **allow a smooth migration** to a digital single European railway area. Not being able to **reuse infrastructure investment** will cost around half the value of the entire GSM-R infrastructure in Europe.