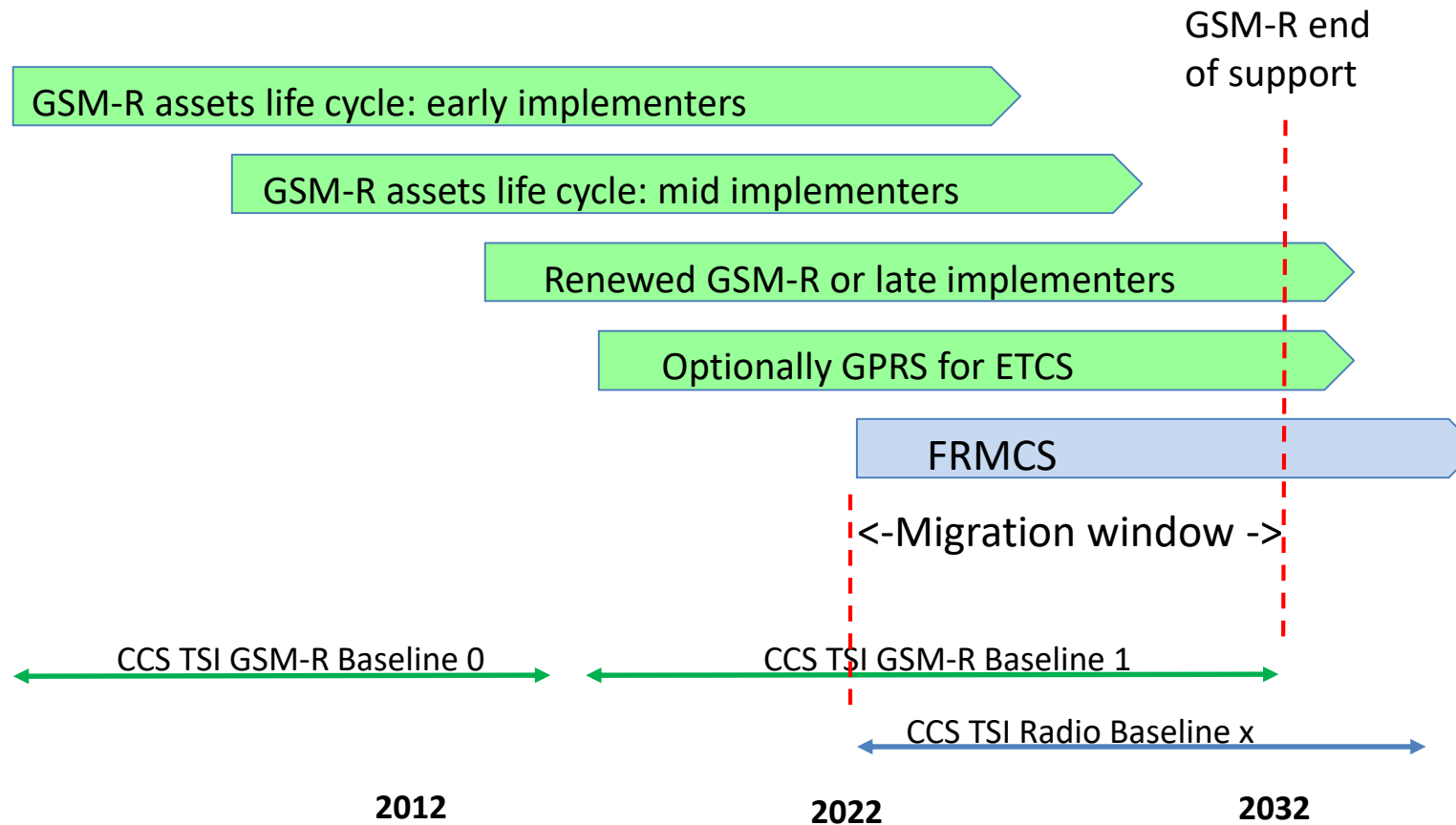


# Principles and risks for the migration GSM-R -> FRMCS

CCRCC 2019

- Situation of GSM-R investments: early, middle, late implementers
- Support of GSM-R is at risk after 2032
- **Indications: most IM's indicate to start implementation of dedicated FRMCS networks around 2028-2030, with the exception of some early/first migrations around 2025**



- **Analysis of future radio communication needs**
  - Enhancement of traffic/capacity, e.g. for ETCS, applications related to Digitalisation of rail
  - Alignment with introduction or expansion of new radio applications
- **Consider the overall life cycle costs of radio systems**
  - Identification of optimal migration window for each IM
  - Taking into account remaining lifetime of GSM-R assets and contractual situation
- **Limit the costs for introduction of FRMCS - spectrum**
  - Re-use of existing GSM-R sites (masts/power supplies, approximately [60-70]% of initial radio investment costs);
  - Prevent (considerable) increase of necessary sites due to radio spectrum decisions
- **After installation of FRMCS trackside, limit the maintenance costs of dual trackside radio systems**
  - **Main question: when is it allowed for IMs to switch off GSM-R?**

- **Operational**

- Limit the non-availability of vehicles due to migration work; combine with other planned updates/revisions where possible

- **Economical**

- No/limited cost impact on existing ETCS OBU
- Combine radio-upgrade with first installation of ETCS (or ATO)

- **Planning**

- Sufficient long announcement time from IM before GSM-R trackside is switched off
- For border crossing vehicles, plans of several IM's to be considered

↔ Potential contradictory economic interest to avoid GSM-R trackside maintenance costs (after FRMCS trackside implementation) versus replacing GSM-R on-board before end of life

↔ Current assessment of national practices: different mechanisms to balance IM and RU interests

### Preliminary Conclusions:

- Due to different investment cycles of GSM-R, no obligation yet in the TSI CCS 2022 to install the successor of GSM-R on new or upgraded lines or in new or upgraded vehicles;
  - Considering the different (expected) migration windows across Member States
- Balance IM and RU interests: Minimum notification time of 5 years by IM (network statement) before switching off GSM-R trackside; notification can only start after availability of on-board FRMCS-specifications in CCS TSI;
- Note: coherent migration framework required across all on-board changes. Analysis of practices across Member States, with potential guidelines on best practices;



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