

Funkwerk FRMCS Status and Migration Q2/2025

Funkwerk Systems GmbH



Funkwerk AG | Traditional. Innovative. SOLUTIONS.

FUNKWERK AG



- Funkwerk AG with headquarter in Kölleda/Thüringen
- four business units: train radio, passenger information, video, technical infrastructure services
- approx. 750 employees (2024), 156 million euro turnover (2023)
- management board: Kerstin Schreiber since 2013



Traditional. Innovative. SOLUTIONS.

5G GATEWAY SOLUTIONS



Funkwerk AG | Traditional. Innovative. SOLUTIONS.

5G GATEWAY SOLUTIONS – ROADMAP



2020

NRM-1

External 5G radio module for railway-compatible use in rail vehicles.



2022

NR26-1

Integrated 5G module for Funkwerk Cab radios and Rack systems.



2023

FGW-x

External 5G gateway with 2 or more modem for multipath/multi-access and OB_{APP} interfaces.



2025

MT18/MTC18

FRMCS RMR Module with multi core application processor



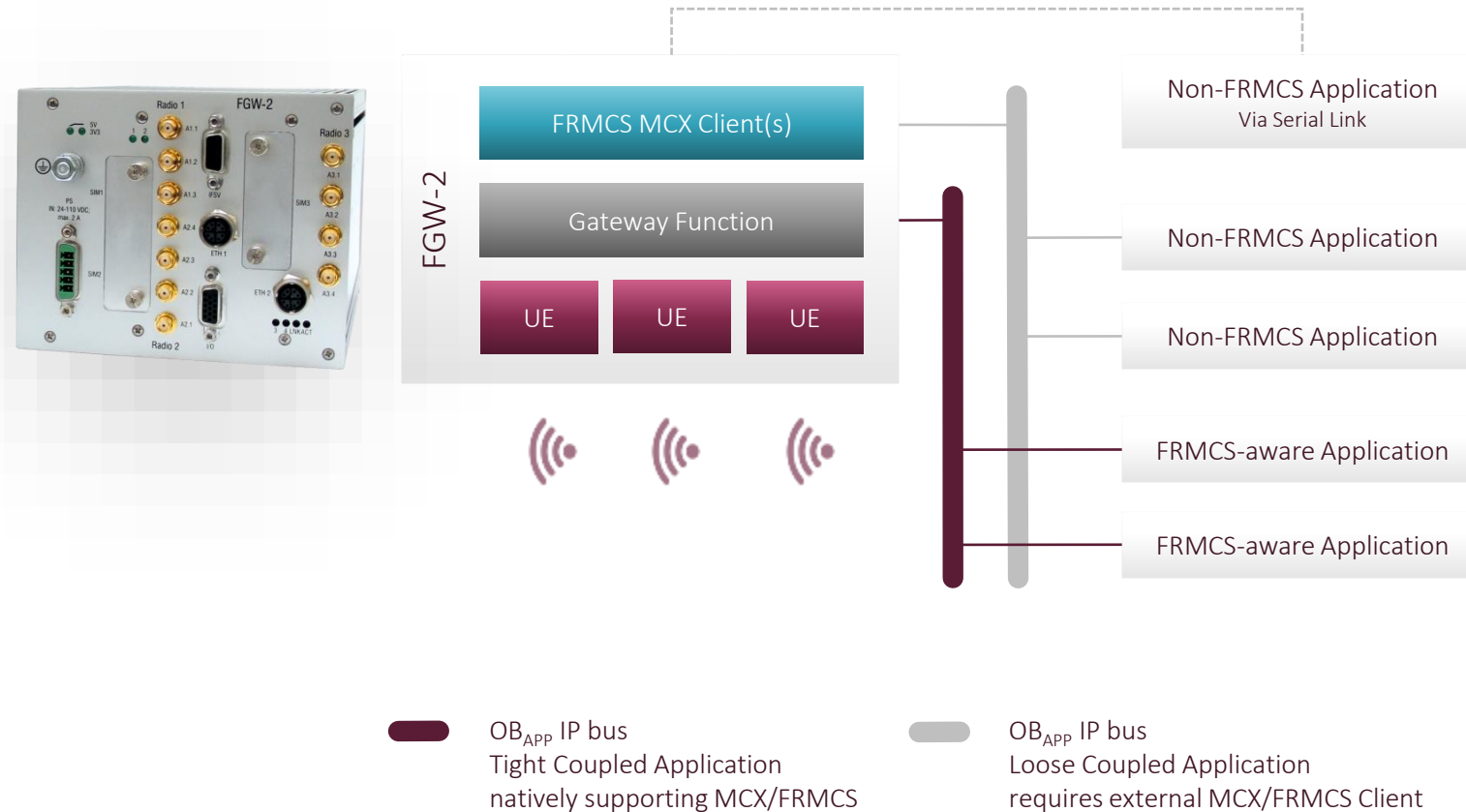
2027

FRMCS

Certification of the 5G Gateways as FRMCS on-board components according to TSI CCS 2027.

Funkwerk AG | Traditional. Innovative. SOLUTIONS.

FUNKWERK 5G GATEWAY SOLUTIONS – FUNCTIONS



FRMCS Client

The virtual FRMCS clients provide the connection to the FRMCS system for applications without own MCX/FRMCS capability.

Gateway function

Provides the necessary functions to coordinate and distribute FRMCS communication from the train to the infrastructure.

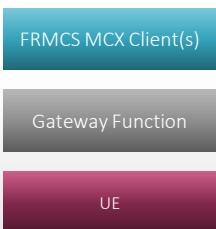
4G/5G user equipment

Radio modules for access to professional and public LTE and 5G NR radio networks.

5G GATEWAY SOLUTIONS – INTERNAL & EXTERNAL (IP20 and IP54)



FGW-1 RMR



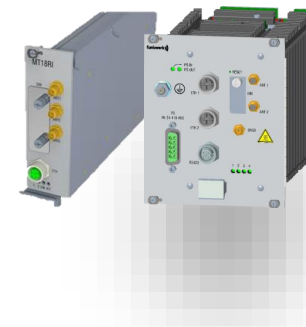
FGW-2 RMR



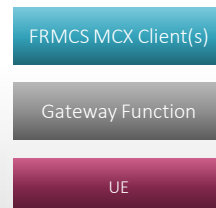
FGW-3 RMR



- MT18x supports FRMCS 900 and 1900 MHz (Band n100 and n101)
- From 1 ... X radio modules, e.g MT18x for RMR or NR26 for public LTE/5G bands with GNSS
- Powerful Quad-Core Arm® Cortex® CPU
- GBit Ethernet interfaces for OB_{APP}
- optional: Bluetooth and Wi-Fi
- Optional support of Multi-purpose I/O interfaces, audio and serial legacy interfaces, various IP based interface options and protocols
- SD and SIM card slot (optional eSIM)
- Meets Railway Standards
- External Modules with wide range power supply from 24 to 110 VDC



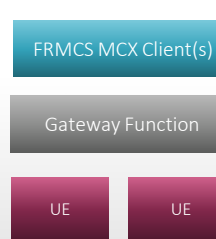
SWI* + MT18



* SWI might be pre-fitted

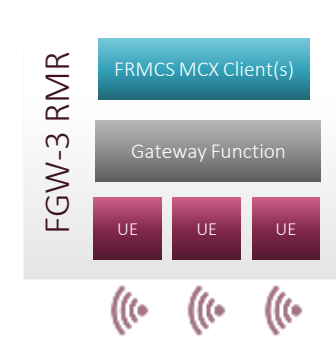


SWI** + 2 x MT18



** MT18 single modules

FRMCS GATEWAY SOLUTION: STANDARD 19" RACK VERSION



- MT18x supports FRMCS 900 and 1900 MHz (Band n100 and n101)
- From 1 ... X radio modules, e.g MT18x for RMR or NR26 for public LTE/5G bands with GNSS
- Powerful Quad-Core Arm® Cortex® CPU
- GBit Ethernet interfaces for OB_{APP}
- Wide range power supply from 24 to 110 VDC, **optional as redundant** version
- Optional support of Multi-purpose I/O interfaces, audio and serial legacy interfaces, various IP based interface options and protocols
- SD and SIM card slot (optional eSIM)
- Meets railway standards

Funkwerk AG | Traditional. Innovative. SOLUTIONS.

FRMCS MIGRATION CONCEPTS TO ROLLING STOCK

Funkwerk train radio systems – existing generations



MESA23

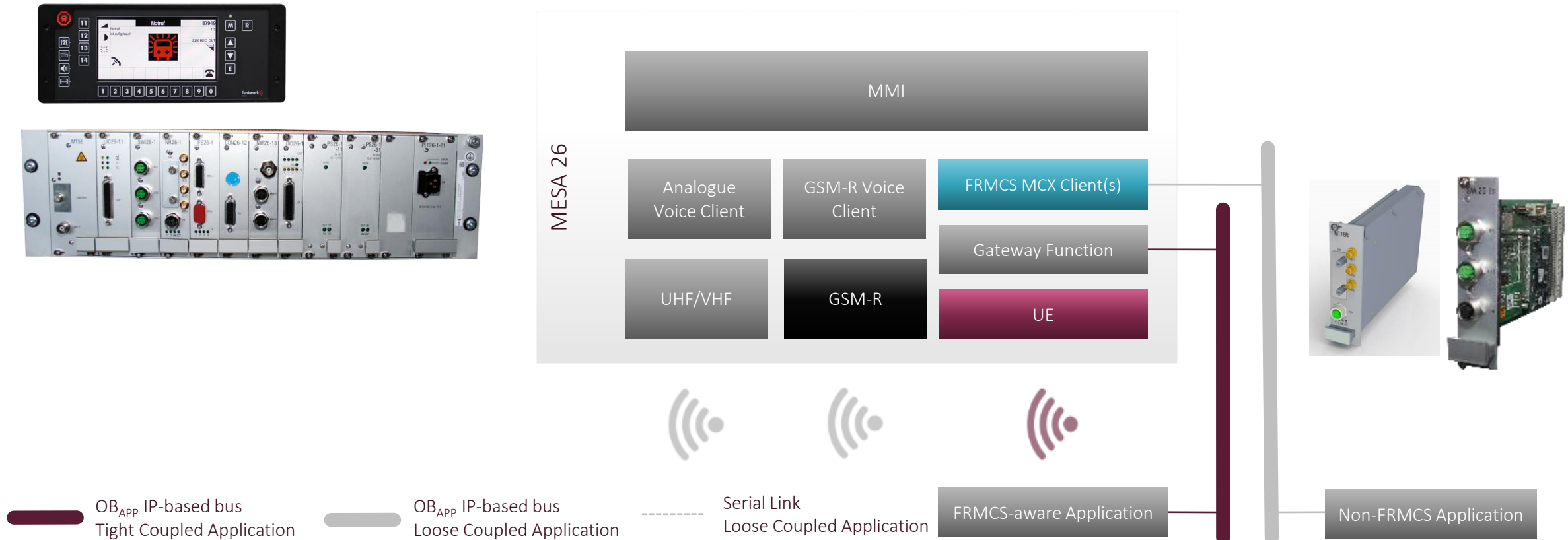


MESA26

MIGRATION OF FRMCS IS POSSIBLE FOR ALL MESA SYSTEMS
Multiple options for specific project needs available

Funkwerk AG | Traditional. Innovative. SOLUTIONS.

MIGRATION SCENARIO MESA®26 WITH INTERNAL MT18 and SWI

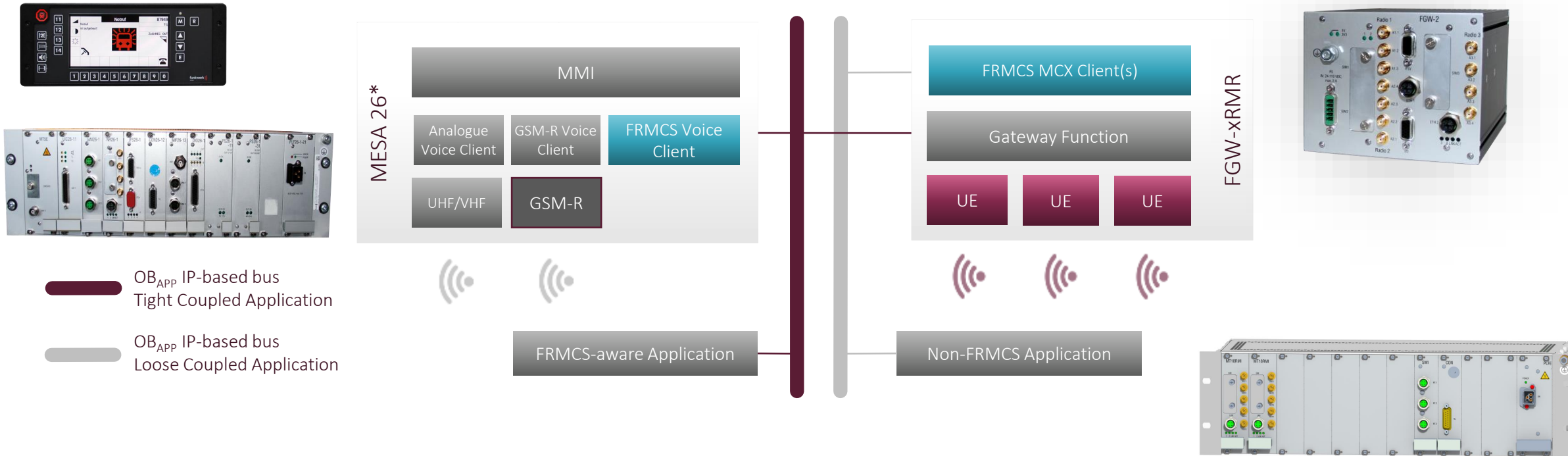


¹ FRMCS MCX Client(s):

- 1 Tight Coupled as MESA 26 FRMCS Voice Client
- 2 Loose Coupled as MCDData Client for EBUa via serial link

Funkwerk AG | Traditional. Innovative. SOLUTIONS.

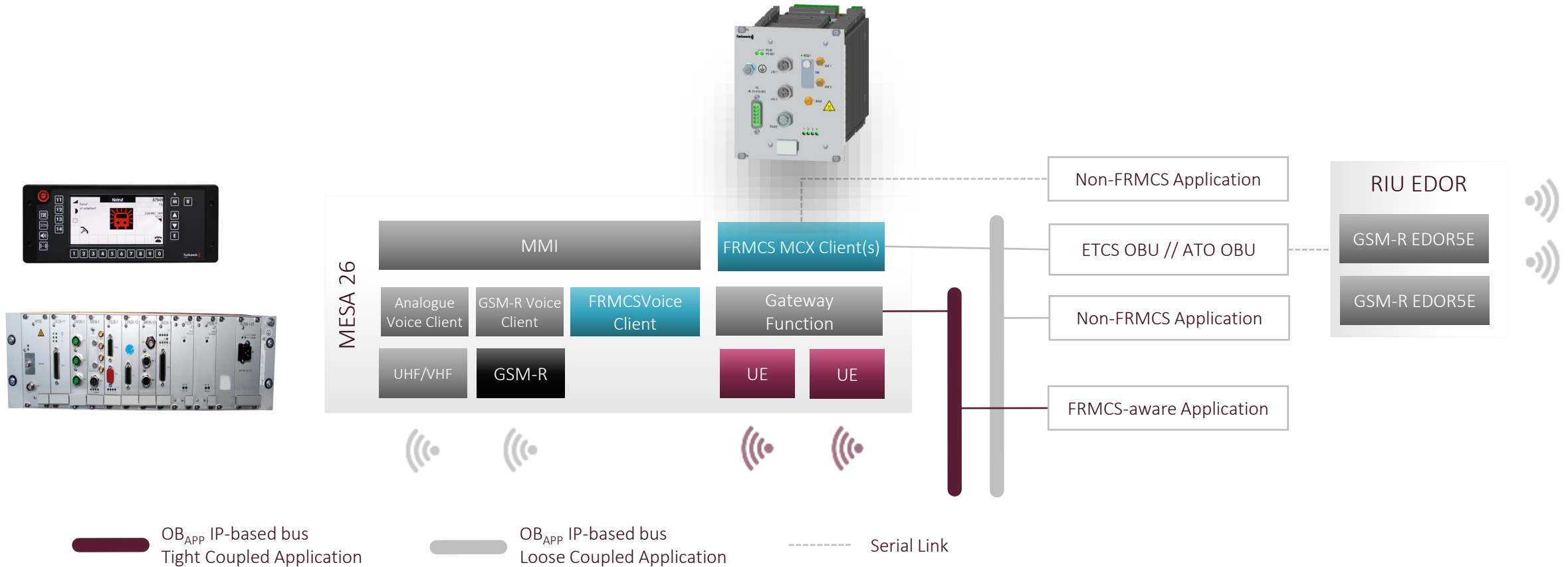
MIGRATION SCENARIO MESA®26 WITH EXTERNAL FGW-xRMR



* powerful controller required

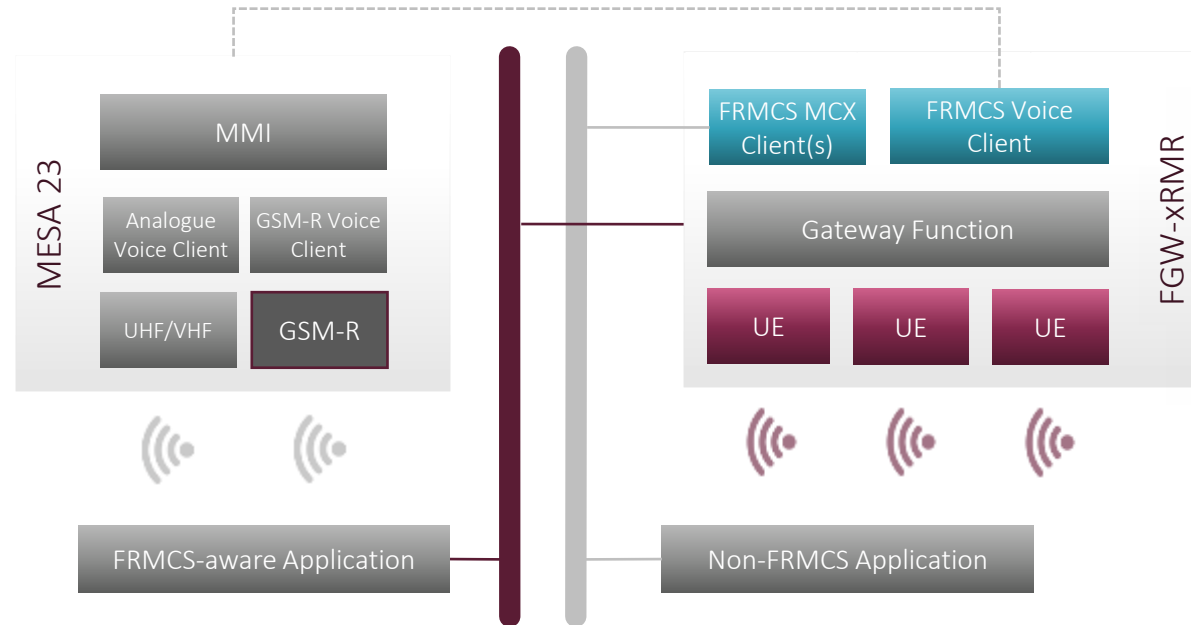
Funkwerk AG | Traditional. Innovative. SOLUTIONS.

EVOLUTION MESA®26 – FRMCS INTERNAL GATEWAY



Funkwerk AG | Traditional. Innovative. SOLUTIONS.

MIGRATION SCENARIO MESA®23 WITH EXTERNAL FGW-xRMR



- OB_{App} IP-based bus
Tight Coupled Application
- OB_{App} IP-based bus
Loose Coupled Application
- Serial Link
requires external MCX/FRMCS Client

Funkwerk AG | Traditional. Innovative. SOLUTIONS.

POSSIBLE FURTHER USE OF 5G DEVICES



- MCX/FRMCS clients for ETCS/ATO purpose
- Regular router functions
- Dedicated SW for remote locomotive operation
- Dedicated voice module function
- ETCS tunnelling option
- Multicast/Multipath options

SINCERE THANKS
We are looking forward to your questions

Hendrik Holz
Head of Sales New Technologies

+49 172 7998 558
Hendrik.holz@funkwerk.com
funkwerk.com

Funkwerk Systems GmbH
Im Funkwerk 5 | 99625 Kölleda

